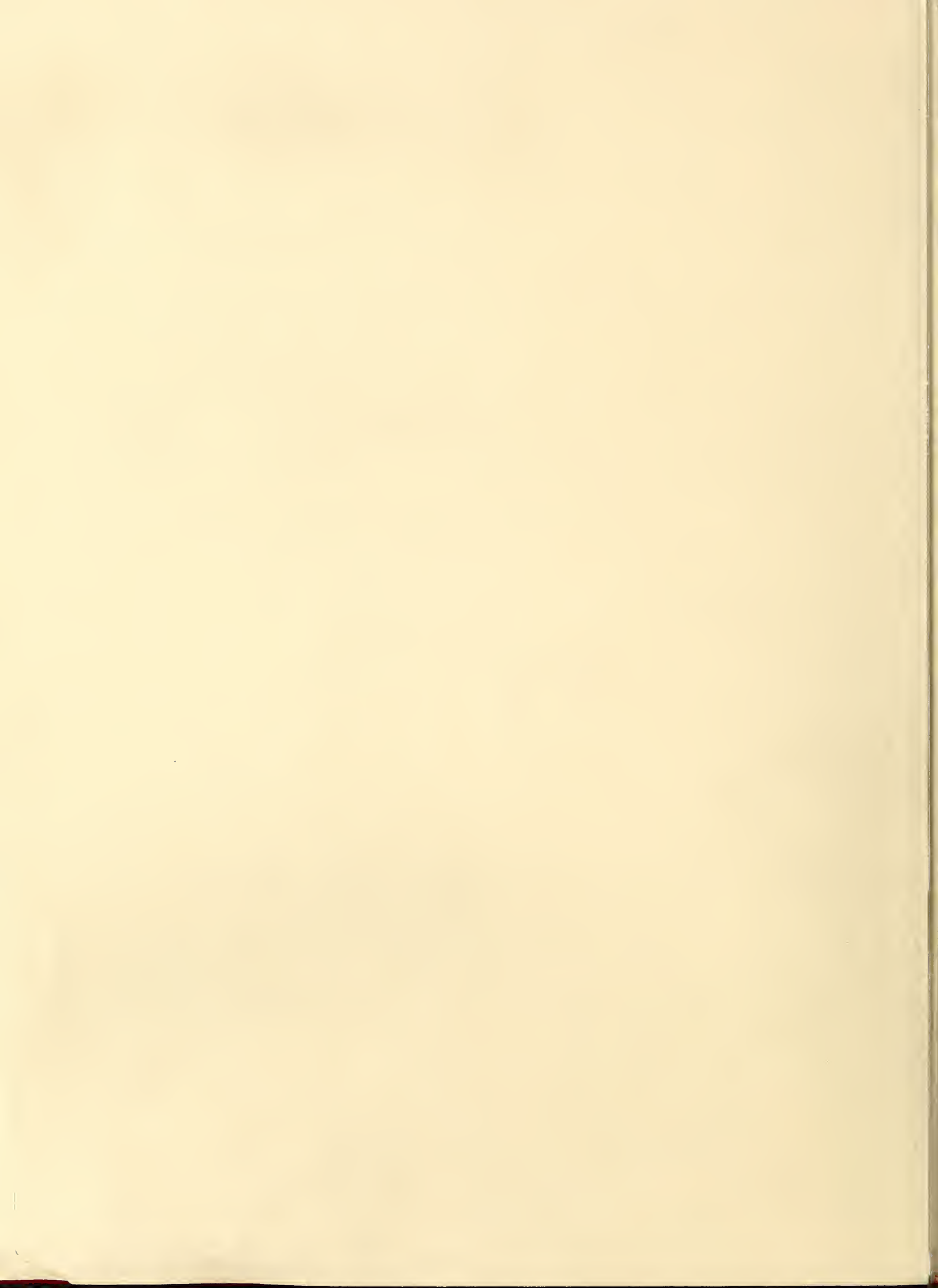


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OFFICIAL ORGAN OF THE NORTHWEST FRUIT GROWERS' ASSOCIATION

VOLUME FIVE

NUMBER SIX

10 CENTS
A COPY

DOLLAR A YEAR

BETTER FRUIT

DECEMBER 1910

PLANTING AND PRUNING EDITION



Gorge of the Columbia River.

From a copyrighted photo by E. H. Kiser

PUBLISHED BY

BETTER FRUIT PUBLISHING COMPANY

HOOD RIVER, OREGON

Own an Irrigated Fruit Orchard

in the famous

Bitter Root Valley

And Provide an Annuity for Old Age

We will plant and take care of the land during the growing period, turning over to you a bearing orchard, which will thereafter yield a competence for life. Easy terms

Send for Literature

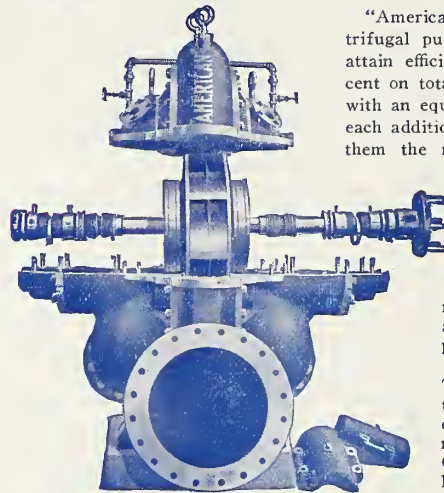
Bitter Root Valley Irrigation Co.

Hamilton, Montana

First National Bank Building, Chicago

All the Grand Prizes and All the Gold Medals
Given by the Alaska-Yukon-Pacific Exposition at Seattle
last summer to pumps were awarded to

“AMERICAN” PUMPING MACHINERY



“American” single stage centrifugal pumps are guaranteed to attain efficiencies of 60 to 80 per cent on total heads up to 125 feet, with an equal increase in head for each additional stage, which makes them the most economical pump made for irrigation purposes.

“American” centrifugals are made in both horizontal and vertical styles, in any size, in any number of stages, and are equipped with any power.

Write for “Efficiency Tests of American Centrifugals,” by the most eminent hydraulic engineer on the Pacific Coast. Complete catalogue, No. 104, free.

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SPOKANE VALLEY ORCHARD SCENE

A HOME and an orchard in the Spokane Valley means the apex of the fruit industry in the Northwest. Our Jonathan and Wagener winter apples excel them all. Our beautiful valley, picturesque surroundings, electric lines and steam railroads, lakes and pleasure resorts, all at Spokane's threshold, makes the ideal location. Our prices are low, but are advancing rapidly.

Send for our circular “A Trip Through the Valley”

SPOKANE VALLEY IRRIGATED LAND CO.

401 Sprague Avenue

SPOKANE, WASHINGTON

NORTHWESTERN FRUIT EXCHANGE

Executive Offices: 908, 910, 911, 912 Spalding Building
Portland, Oregon

A Federation of Local Fruit Growers' Associations in
the States of Oregon, Washington, Idaho and Montana

PURPOSE: To obtain for the fruit growers of the Pacific Northwest the utmost possible measure of money returns for their products.

PRINCIPLES: Securing for its membership the advantages of modern, scientific salesmanship, and a high order of business ability in the marketing of the fruits, through employment by the **united body** of the most competent and thoroughly trained talent available.

Economy in cost of marketing, through distribution of operating cost over a large volume of business, thus reducing to a minimum the cost per package to the individual.

Knowledge of the operation of the laws of supply and demand, which determine true value, and of the peculiarities of every market of the **world**, thereby avoiding many costly mistakes.

Development of New Markets, at home and in foreign countries, and the broadening of the demand for Northwestern fruits. The maintenance of the enviable reputation of our fruits for peerless quality in markets where they are already known, and their introduction and persistent upbuilding in markets where they are unknown.

The Establishment of Uniform Grades which will furnish a **standard** of value, thereby avoiding the present deplorable uncertainty and confusion on the part of the rank and file of the buying trade and enabling the fruit to be accurately and intelligently described to the **absent buyer**.

Through insistence on the part of its local associations of the observance of the grading rules, and the use of a standard and well filled package, to cultivate that **confidence** on the part of the buying trade which makes for stability of the market and the avoidance of the wild fluctuations which arrest consumption and unsettle confidence.

The Protection of the Relatively Defenseless Individual by the formidable strength of **union** in dealing with occasional unscrupulous or irresponsible buyers and in their relations with the **railroads** in matters of equitable rates, improved schedules, payment of just claims and other matters where the weight of a united and influential body assures results impossible where each man, or each district, works alone.

In General, the employment of the "machinery" of the **Exchange** wherever united strength can promote the general good of the industry.

THE POLICY OF THE EXCHANGE: Scrupulous handling of the growers' fruits and funds; the sales records of the **Exchange** are **wide open to any fruit grower at any time**.

The **encouragement and support of existing local associations**.

The assistance in the formation of new local associations where they are needed.

The **Exchange** invites the management of local associations and fruit growers generally to **examine its records of f.o.b. sales** during the season of 1910—and invites conferences looking to affiliation with the **Exchange**.

The **Exchange** also invites applications for aid in organizing new local associations, and will freely assist in this great, necessary, fundamental work.

The **Exchange** has published a booklet dealing briefly with its history and its purpose, and will gladly send it to anyone who may be interested.

NORTHWESTERN FRUIT EXCHANGE

HOOD RIVER

The Modern Garden of the Hesperides

“Within the Shadow of Mighty Mount Hood”

“Where the rain and sunshine meet.” There grow the finest and most delicious apples in all the wide, wide world. Every apple picked by hand and packed in the most scientific manner under the direct and personal inspection of the Board of Directors of the

Hood River Apple Growers' Union

We take pleasure in advising the trade that for the third consecutive time practically the entire crop of this noted valley has been purchased by us.

The early fall varieties are now rolling and will be succeeded within a week or two by the noble NEWTOWN PIPPIN, the delicious SPITZENBERG, the magnificent GOLDEN ORTLEY and such other varieties as grow to perfection only in the Hood River Valley.

Steinhardt & Kelly

New York

The Most Extensive Operators in High Class Fruits in the World

Gibson Fruit Company

Not Incorporated

*Wholesale Commission
Shippers' Marketing Agents
Fruit and Produce*

Our Own Cold Storage Plant on Premises

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CHICAGO, ILLINOIS

**LINDSAY
& CO. LTD.**

Wholesale Fruits

HELENA, MONTANA

Established in Helena Quarter of a Century

Branch houses: Great Falls, Missoula and Billings, Montana

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Company**

Wholesale Fruits & Produce

Spokane, Washington

We have modern cold storage facilities essential for the handling of your products

Reliable Market Reports

PROMPT CASH RETURNS

Pearson-Page Co.

131-133 Front Street
PORTLAND, OREGON

Superior facilities for handling

**PEACHES
APPLES AND
PEARS**

Solicit Your Consignments

Reliable Market Reports Prompt Cash Returns

SIMONS, SHUTTLEWORTH & CO.

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European Receivers of American Fruits

For Market Information Address:

Simons, Shuttleworth & French Co.
204 Franklin Street, New York

Walter Webling
46 Clinton Street, Boston

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Wm. Clement
Montreal, Quebec

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Portland, Maine

OUR SPECIALTIES ARE APPLES AND PEARS

CAPITAL AND SURPLUS \$300,000.00

GAMBLE-ROBINSON COM. CO.Incorporated
MINNEAPOLIS, MINNESOTA**WANTED-BOX APPLES**

Associate Houses: Gamble-Robinson Co., Oelwein, Iowa; Gamble-Robinson Fruit & Produce Co., Pipestone, Minnesota; Gamble-Robinson Fruit & Produce Co., Mankato, Minnesota; Gamble-Robinson Fruit Co., Miles City, Montana; Gamble-Robinson Fruit Co., Aberdeen, South Dakota; Gamble-Robinson Company, Rochester, Minnesota; Gamble-Robinson Fruit Co., St. Paul, Minnesota.

REFERENCES: SECURITY NATIONAL BANK, THE PACKER, DUN AND BRADSTREET

*Ship Your APPLES and PEARS to the Purely Commission and Absolutely Reliable House***W. DENNIS & SONS**

LIMITED

COVENT GARDEN MARKET
LONDON*and*CUMBERLAND STREET
LIVERPOOL

W. E. BIGALOW, President

Capital and Surplus \$75,000.00

H. J. BIGALOW, Secretary and Treasurer

Established 1883

REFERENCES:

The First National Bank, Cleveland
All Commercial Agencies
The Produce Reporter Company
Any reliable house in our line in the
United States



SOME OF OUR SHIPPERS—REFERENCES:

The California Growers' Exchange, Los Angeles, Cal.
The California Fruit Distributors.
The Earl Fruit Company.
The Pioneer Fruit Company.
The Producers' Fruit Company, Sacramento, Cal.
The Stewart Fruit Company, San Francisco, Cal.
The Atwood Grape Fruit Company, Manavista, Fla.
The Georgia Fruit Exchange, Atlanta, Ga.
The Florida Citrus Exchange, Tampa, Fla.
Crutchfield & Woolfolk, Pittsburg and Chicago.
Redlands Golden Orange Association, Redlands, Cal.

*Commission Merchants**Jobbers and Wholesalers*

Cleveland, Ohio

APPLES**Plums Prunes Pears Oranges Lemons**

We have the largest and best trade in the Cleveland territory; our facilities are unsurpassed

We have had years of experience in handling box apples and fancy fruits

WE SOLICIT YOUR CORRESPONDENCE AND SHIPMENTS

D. CROSSLEY & SONS

Established 1878

APPLES FOR EXPORT

California, Oregon, Washington, Idaho and Florida fruits. Apples handled in all European markets. Checks mailed from our New York office same day apples are sold on the other side. We are not agents; we sell apples. We make a specialty of handling APPLES, PEARS AND PRUNES on the New York and foreign markets. Correspondence solicited.

200 TO 204 FRANKLIN STREET, NEW YORK

LIVERPOOL

NEW YORK

BOSTON

GLASGOW

Rae & Hatfield

317 Washington Street, New York

Largest Handlers of Pacific Coast Fruits in the East

REPRESENTING THE FOREMOST WESTERN SHIPPING COMPANIES AND ASSOCIATIONS
ON THE NEW YORK MARKET

Operating in All Producing Sections

Reliable

Experienced

Prompt



*Best Service and Protection is Secured by Dealing
with Members of the*

NATIONAL LEAGUE OF COMMISSION MERCHANTS OF THE U. S. A.

AN ORGANIZATION OF RELIABLE AND RESPONSIBLE RECEIVERS IN TWENTY-EIGHT MARKETS
FOR FREE DIRECTORY OF MEMBERS, WRITE R. E. HANLEY, PUB. MGR., BUFFALO, NEW YORK

APPLES WANTED

Parties desirous of a first-class connection in the Chicago market for the handling of box apples and other fruit are invited to correspond with us. Our location is one of the best in Chicago. Our facilities for disposing of apples and other fruit are unsurpassed. Our responsibility is above question. Write or wire us what you have to offer.

COYNE BROTHERS

The House that "Gets there"

161 South Water Street, CHICAGO

Richey & Gilbert Co.H. M. GILBERT, *President and Manager*

Growers and Shippers of

**YAKIMA VALLEY FRUITS
AND PRODUCE**Specialties: Apples, Peaches,
Pears and Cantaloupes

TOPPENISH, WASHINGTON

*Correspondence Solicited***RYAN & VIRDEN CO.**

BUTTE, MONTANA

*Branch Houses:*Livingstone, Billings, Sheridan,
Montana; Lewiston, Idaho**Wholesale Fruit and Produce**WE HAVE MODERN COLD STORAGE FACILITIES
ESSENTIAL FOR HANDLING YOUR PRODUCTS*A strong house that gives reliable market
reports and prompt cash returns*

The Old Reliable

BELL & CO.

Incorporated

WHOLESALE

**FRUITS AND
PRODUCE**112-114 Front Street
PORTLAND, OREGON**Levy & Spiegel**

WHOLESALE

FRUITS & PRODUCE**Commission Merchants**

SOLICIT YOUR CONSIGNMENTS

Top Prices and Prompt Returns
PORTLAND, OREGON

FAMOUS HOOD RIVER

APPLESSpitzenbergs, Newtowns, Jonathans,
Arkansas Blacks, Ortleys, Baldwins,
Winesaps, R. C. Pippins, Ben Davis,
M. B. Twigs

Look Good, Taste Better, Sell Best

*Grade and Pack Guaranteed***Apple Growers' Union**

Hood River, Oregon

IF YOU WANT TO
MARKET YOUR**FRUIT**

RIGHT

ALWAYS SHIP TO

W. B. Glafke Co.WHOLESALE FRUITS
AND PRODUCE108-110 Front Street
PORTLAND, OREGON

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DRYER, BOLLAM & CO.

GENERAL COMMISSION MERCHANTS

128 FRONT STREET

PHONES: MAIN 2348
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PORTLAND, OREGON

SGOBEL & DAY*Established 1869*

235-238 West Street

NEW YORK

Strictly commission house. Specialists in apples,
pears and prunes. Exporters of Newtown Pippins
to their own representatives in England**QUALITY
QUALITY
QUALITY****Mark Levy & Co.**COMMISSION
MERCHANTS**WHOLESALE FRUITS**121-123 FRONT AND
200 WASHINGTON ST.

PORTLAND, OREGON

John B. Cancelmo

WHOLESALE DEALER IN

**FANCY
BOX APPLES**127 Dock Street
PHILADELPHIA, PA.

Cold Storage for Apples

We are prepared to handle any quantity of apples in our Cold Storage Plant. Rates according to quantity. Tell us how many boxes you want stored and we will quote you prices

Independent Coal & Ice Co.
Portland, Oregon

It's a Mathematical Proposition

THAT

$$\text{GOOD FRUIT} \div \text{GOOD CUSTOMERS} = \text{GOOD MONEY}$$

It is up to every shipper to grade and sell his fruit according to Produce Reporter Grades and Trading Rules. Then his customers know what to expect, both as to the quality of the fruit and as to the Trade Rules that shall govern if any difference arises. Thus, both parties arrive at a common understanding, at the beginning of the deal, which **does much to prevent future trouble.**

Now as to the second factor in the equation, viz., **good customers.** The desirable customer is the one who has established a reputation for honorable treatment of his distant customers. The Produce Reporter Co.'s first object is to secure in its files the antecedent and to-date business history of all wholesale fruit and produce dealers (and allied lines) and **to rate them accordingly** by the following key:

XXXX, Excellent; ship open.

XXX, Good; ship draft on bill of lading.

XX, Fair; perhaps draft on bill of lading, perhaps bank guarantee, according to circumstances.

X, Cash before shipping.

X—, Let strictly alone.

The moral effect of this rating system is alone a powerful protective influence; add to it a well equipped Adjusting Department, prepared to inspect and adjust disputed shipments **anywhere** in the United States, and it completes a system worth your investigating.

ADDRESS EXECUTIVE OFFICES OF
PRODUCE REPORTER COMPANY
34 South Clark Street, Chicago, Illinois

LEO UJFFY

New Orleans, Louisiana

Successor to

APPEL & UJFFY

The largest wholesale exclusive
Fruit and Fancy Vegetable Firm in the South

**IMPORTERS, RECEIVERS, JOBBERS AND
COMMISSION MERCHANTS**

Correspondence solicited

Davenport Bros.

Portland, Oregon

**WHOLESALE
FRUIT &
PRODUCE**

Growers and Shippers of the Famous

Mosier Valley Fruits

NEW ORLEANS

IMPORTERS
JOBBER

Wholesale
Commission

LAUX & APPEL

All Fruits in Season

STORAGE FOR
FIFTY CARS

The Acknowledged Fancy
Fruit House of New Orleans

The
House YOU Want

MCEWEN & KOSKEY

Wholesale Fruit and Produce
and General Commission
Merchants

129 Front Street, Portland, Oregon

CONSIGNMENTS

Are solicited, all your shipments
receiving our personal attention

Would'n't
You Like to
Own an Orchard
that Would Make
Good, Big Money
for You?



A PRODUCING ORCHARD AT OPPORTUNITY, WASHINGTON

OPPORTUNITY

Three miles from Spokane—offers you the greatest opportunity of your lifetime. Here you can own an orchard in the best and nearest fruit district to Spokane and become independently wealthy in a short time.

Now we want to prove this to you. We want to put you in touch with people who are now making money at OPPORTUNITY, and they will tell you all about this wonderful fruit district. We have letters from them printed in our booklet.

Now, LISTEN! OPPORTUNITY is a high class fruit district, with electric lights, telephone service, splendid irrigation system, railroad facilities of the best, and all other conveniences that you could desire.

A great deal of money has been expended at OPPORTUNITY to make it the most ideal orchard district in the Northwest, and that's why it is such a great success.

GET THE BOOKLET TODAY

**Modern Irrigation
and Land Co.**

P. A. SUMMERLAND, General Sales Agent

326 First Avenue Spokane, Washington

Gentlemen: Please send me your booklet about Opportunity.

Name.....

Address.....

ARCADIA IRRIGATED ORCHARDS

THE CENTER OF THE RICH WASHINGTON FRUIT BELT

Arcadia is located twenty-two miles from Spokane, Washington. It's a true fruit district—with every conceivable advantage for making money in the fruit business.

Rich soil, gravity irrigation system, excellent railroad facilities, ideal climate.

Our Plan—We plant, cultivate, irrigate and care for your orchard for four years; we pay your taxes for five years. You can remain where you are while we bring your orchard into bearing.

Arcadia is the largest irrigation project in the West. Prices advance January 1st, 1911, so it will pay you to investigate Arcadia now. Ask for literature.

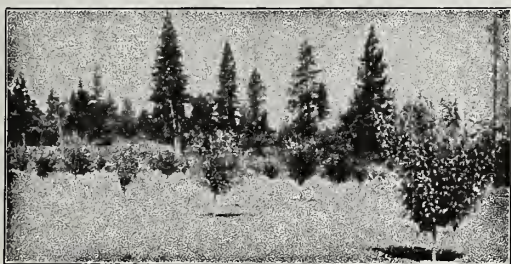
ARCADIA ORCHARDS COMPANY

HYDE BLOCK

SPOKANE, WASHINGTON

"THE LAND WHERE THE RAIN AND SUNSHINE MEET"

LYLE, WASHINGTON



A YOUNG ORCHARD NEAR LYLE

A land wonderfully favored in climate, soil and environment. Apples and all tree fruits grow to perfection without irrigation. Lands for wheat raising, hay and dairy farms. Also for small fruits.

FOR BOOKLET AND FURTHER INFORMATION ADDRESS

LYLE COMMERCIAL CLUB

Lyle, Washington

\$1000

PER ACRE NET

\$1000



MOSIER APPLES AT HOOD RIVER FAIR

This is not an unusual profit for producing apple orchards in Oregon. It is a perfectly possible profit for any man of persistence and common sense who will select land in a proven apple district in Oregon and develop it properly. If you are at all interested in fruit growing we advise you to investigate the Mosier Valley. This valley adjoins the famous Hood River Valley, and is properly a part of it, so far as the character of the soil and the quality of the fruit produced is concerned. We claim that the apples produced in Mosier Valley are second to none and that there is no section anywhere which offers the fruit grower a greater opportunity. Land in the Mosier Valley can be obtained for very low prices, and can be cleared with comparatively little effort. These lands can be made to increase in value from 100 to 500 per cent in two years by clearing and planting trees. We invite the most careful and critical inspection of Mosier Valley, confident of the outcome. *For full particulars about this Valley address*

SECRETARY MOSIER VALLEY COMMERCIAL CLUB

MOSIER, OREGON

MOSIER

OREGON

Six Miles From Hood River

HAS:

- The best of apples and other fruit;
- The best climate;
- The best soil;
- The best record of prices for apples;
- The best scenery in Oregon;
- The best fruit growers' union;
- The best market conditions;
- The LOWEST PRICES for PROVEN fruit land,
- And a RELIABLE REAL ESTATE DEALER,

NO TROUBLE TO ANSWER QUESTIONS **D. D. HAIL, Mosier, Oregon**

WHITE SALMON VALLEY

NON-IRRIGATED

Having direct water TRANSPORTATION, after the Panama Canal is built, it is estimated that White Salmon and Hood River Newtowns can be put on the English market for 35 cents a box.

American Consulate,
Belfast, Ireland, March 15, 1910.
Editor Better Fruit:

I take pleasure in enclosing you a copy of a report made to W. K. Newell on "The Apple and Pear Markets of Europe," which may be of some special interest to you.

Very truly yours,

Henry B. Miller, Consul.

The following quotation is taken from the above mentioned report:

"This year all the apples from irrigated districts have proved very unsatisfactory, especially those arriving after January 1, as from one-quarter to one-third are more or less decayed.

"I have seen large, fine looking Winesaps, Rome Beauties and other equally hardy varieties from irrigated districts arriving in a bad state of decay, and dealers have entered a strong complaint.

"I find that apples from non-irrigated districts coming into the markets after the first of the year uniformly bring the best prices."

DEVELOPMENT LEAGUE, WHITE SALMON, WASHINGTON

White Salmon Orchard Lands

The "White Salmon" Valley offers as good an investment for the man with little means as the man of wealth. Fortunately this district is not bought up by speculators; small tracts of ten acres or more can be bought on easy terms direct of us, we acting as agents for the original homesteaders in many cases. Below we quote a few special tracts that are bargains. Our complete list sent on request.

580—10 ACRES, 2 miles out; flowing spring water. Cheap at \$125 an acre. Cheapest small tract, so near town, on the market.

550—20 ACRES, with 12½ acres under plow, 10 acres in young Spitzenberg and Yellow Newtown apples, 3 acres in bearing strawberries; house, stable and well; red shot soil. Only two miles from White Salmon. Price \$325 an acre; one-third cash, balance 3 years, 8 per cent.

583—80 ACRES, all good orchard land, excepting 3 acres which is low, making good hay land; elevation 1,600 feet; deep red shot soil; 2 acres in cultivation; 4-room plastered, frame house, which cost \$400; log barn; 12 acres brush land, which is easily cleared; all year spring. A first-class county road suitable for automobile use passes within ¼ mile of this tract; only 8 miles to the Columbia River and North Bank Railway; 1½ miles to Snowden post office; fine view of Mount Adams. Price for 30 days only, \$47.50 an acre, on easy terms.

553—10-ACRE TRACT 7 miles from White Salmon, on county road; red shot soil, light fir timber; near the White Salmon Orchard Company's large bearing orchard. For an immediate sale, price only \$125 an acre; half cash, balance 3 years, 8 per cent.

516—30 ACRES, 1 mile from Husum, 6 from White Salmon, ½ mile to White Salmon River; on county road; all but 4 acres nearly level; two all-year springs; good soil. Mail and stage each day except Sunday between White Salmon, Husum and Trout Lake. Land on three sides cleared and set to orchards. This piece has been tied up until recently, but can be bought, if taken soon, at \$140 an acre, on easy terms.

600—80 ACRES, 8 miles from White Salmon, 2½ miles from Husum; fine view of Mount Adams and Mount Hood; soil red shot, spring water the entire year; over 50 acres orchard land, balance pasture. Present price only \$37.50 per acre; one-third cash, balance 3 years, 8 per cent.

DAY BROTHERS

WHITE SALMON REALTY CO.

WHITE SALMON, WASHINGTON

Irrigated Orchard Tracts **Rogue River Valley**



COMPLETED SECTION OF NEW CANAL. ROGUE RIVER VALLEY CANAL COMPANY. WILL IRRIGATE FIFTY-FIVE THOUSAND ACRES

WRITE FOR THREE REASONS WHY THE ROGUE RIVER VALLEY IS ENTITLED TO BE CALLED THE BEST FRUIT DISTRICT IN AMERICA.

It won the Grand Sweepstakes Prize at the Spokane National Apple Show, and has been declared by government experts to be the most perfect fruit belt in the world.

Every acre of our irrigated orchard tracts carries with it a perpetual water right.

We plant and care for orchards on the yearly or monthly payment plan.

If you would succeed from the start, come to a proven district.

WRITE US FOR FULL INFORMATION

ROGUELANDS INC.

Fred N. Cummings, Manager

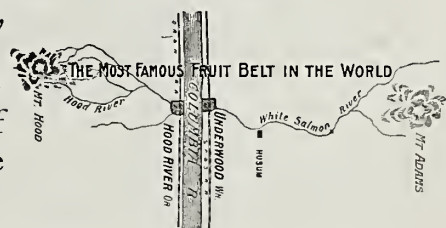
MEDFORD, OREGON

UNDERWOOD

The Gateway to the Famous White Salmon Valley

If you want a strictly first-class location for growing high-grade fruit, close to the river and railroad, within sight of the town of Hood River, with the best of everything in the way of shipping and social advantages, call on or write

W. F. CASH, UNDERWOOD, WASHINGTON



HOOD RIVER APPLE LAND CHEAP

The impression has gotten abroad that a man must be a millionaire to buy land in the Hood River Valley. This is not so. While our bearing orchards are paying a net income on several thousand dollars per acre, there is still left thousands of acres of uncultivated lands that can be had at low prices. This land when put in cultivation increases in value at a very rapid rate.

We have for sale some of the finest unimproved apple land in the Hood River Valley, at prices as low as \$50.00 per acre.

F. R. Brydle Co.

Apple Growers Bank Building, Hood River, Oregon

Please send me handsome illustrated booklet of Hood River Valley and list of properties.

Name

Address



Fancy Hood River Apple Pack

HOOD RIVER

Won the Grand Sweepstakes Prize at the National Apple Show, also First Prize on Car Load of Spitzenbergs and First Prize on Car Load of Yellow Newtowns

This proves again the superiority of the Hood River apple. Not only do they capture first prizes wherever exhibited, but every year the Hood River apples are the first ones sold, and always bring the top prices.

Make your home in Hood River. Get in with the winners and be sure of a good profit for your labor. Send for our list of orchard tracts and business opportunities.

J. H. HEILBRONNER & CO.

THE RELIABLE DEALERS

The Davidson Building

HOOD RIVER, OREGON

HOOD RIVER APPLE LANDS

Pay Big Dividends—Values Will Double in Three Years

WRITE FOR COMPLETE LIST OF PROPERTIES

20 ACRES, 7 miles southwest of Hood River; red shot soil, good drainage; close to school and store; 4 acres Newtowns and Spitzenbergs, 1 year old; 12 acres slashed and burned; balance light timber; spring water; good location. A bargain at \$5,000; \$2,000 cash will handle it.

10 ACRES, 3 miles southwest of Hood River; all set to Newtowns and Spitzenbergs, in good condition; volcanic ash soil, good drainage; on main county road. This is a snap at \$7,000; \$3,000 cash will handle it.

20 ACRES, 9 acres set to commercial orchard, mostly three-year-old trees; 3 acres young strawberries; 5 acres partly cleared, balance in meadow; water stock; small house; near school, store and railway station. Price \$10,000; \$4,600 cash.

75 ACRES, beautiful modern home, 2½ miles from town; 30 acres under cultivation; 16 acres in orchard in prime condition, part full bearing; 14 acres in meadow. Place will show profit this year of over \$5,000 on the crop. Team and all implements included. Price \$35,000.

30 ACRES, best red shot soil, scientifically planted to standard commercial orchard, some full bearing; living stream of water, close in; genuine bargain. \$23,000; very good terms.

15 ACRES, all planted to Newtowns and Spitzenbergs, 1 to 4 years old, save ½ acre in meadow; close to town; red shot soil. Price \$11,000; \$4,000 cash.

20 ACRES, unimproved, 6 miles south of Hood River; good drainage, excellent location; all under ditch and A1 orchard land. Good buy at \$3,500; \$1,250 cash, balance 3 or 5 years.

10 ACRES, near school, store and railway station, on main road; good soil, good drainage; all set to 2-year-old Newtowns and Spitzenbergs; excellent condition; beautiful building site. Price \$5,500; \$1,500 will handle it.

20 ACRES, partly improved; red shot soil, high and slightly; perfect drainage. This tract lies fine for orchard; beautiful building spot. Genuine bargain at \$350 per acre; \$2,000 cash.

DEVLIN & FIREBAUGH

THE LEADING DEALERS

Swetland Building, Portland, Oregon

Hotel Oregon Building, Hood River, Oregon

BETTER FRUIT

A MONTHLY ILLUSTRATED MAGAZINE PUBLISHED IN THE INTEREST
OF MODERN AND PROGRESSIVE FRUIT GROWING AND MARKETING

PRUNING, OR THE BUILDING OF AN APPLE ORCHARD

BY A. I. MASON, HOOD RIVER, OREGON

THE successful architect, before he plans to build a house, always selects some certain style of structure and then tries to follow it to completion. It is just so with the successful orchardist; he should first determine the style of structure of a tree that he desires and then follow it to completion. In other words, do not start an orchard by pruning a certain way one year and thereafter change it annually. If you do so, you will never obtain the desired results. If you want a tree with an open-center head or one with a center-stalk head you should begin your pruning with that fixed idea and follow it until completed. To obtain these two styles of trees requires an entirely different construction. I shall not attempt to describe in this article the construction of a center-stalk tree, for almost every horticultural paper or magazine has scores of writers who have been supplying us for years with their superior center-stalk arguments, and, I might add, that they never forget to ridicule the open-center headed tree. Now, I will not be so severe on those writers, for I know they are honest and believe they are advocating the best method, yet I believe they are wrong, and I shall endeavor to prove it. I cannot forget some of the arguments I have had in years past with many prominent apple growers to whom I tried to explain wherein the open-center headed tree was by far superior. But time has made some changes, and, being a natural born Missourian, I have tried to show them wherein an open-center headed tree, as I am growing, has many advantages over the center-stalk tree.

The building of an apple tree should begin when the tree is first set in the orchard—in fact, the roots should be pruned before setting. Figure 1 shows a tree as it should be set. The bruised ends of all roots should be cut off smoothly, and if gnarled or crossed roots are found they should be pruned back so as to leave all roots pointing in as near a natural outward position as possible. After the tree is set and the dirt firmly pressed around it, being careful not to make it higher than the surrounding surface of land, you should then make your first pruning. If you have just one straight stalk, which I much prefer, you should make your first cut about eighteen or twenty inches from the ground, as

shown at "A," Figure 1, leaving the terminal bud toward the prevailing winds. If when setting your one-year-old trees you find some small side limbs below the twenty-inch cut, which is quite common with strong, vigorous trees, you should cut them back from two inches

time. Figure 2 shows a tree just after pruning in the early spring following first year's growth. This was a one-year-old tree when set, and one which possessed three small side limbs. You will observe that all of these side limbs were cut back at setting time, as shown at "A," Figure 2. I also at this time cut out the center stalk just above the crotch formed by this whorl of three limbs. This we will designate as the first pruning. During the first few weeks' growth after a tree is set it will put out small sprouts at nearly every bud on the main stalk. All of these should be kept pinched back or rubbed off except the three or four stronger sprouts, which should be evenly distributed around the stalk. Then about the middle of July I make my second pruning, and cut off the main uprights, as shown at "B," Figure 2. I also then remove all inside limb growth and leave only what few limbs have started to grow outward, and in such manner as to form a symmetrically shaped head. If side limbs are of uneven length I also clip back the longer ones, so as to form a well balanced head.

In building an open-center headed apple tree one should always bear in mind that the main upright stalks should be given the advantage in every respect. Always keep them in advance of the rest of the tree. All inside growth should be kept out, and the main uprights should never be headed back as severely as rest of tree. After a few years your whorl of center uprights will each become just as strong and vigorous growers as the original center stalk of a naturally shaped tree. Do I hear someone saying, "Let nature have its own way and grow a naturally shaped tree?" Yes, and I heard a prominent apple grower make this same statement in Columbia, Missouri, two years ago. It was at their state horticultural meeting, and this grower seemed to be proud that he had an eighty-acre orchard which had never been pruned. Said he: "Nature provides to shape a domestic tree as well as one of the forest." To those who believe this theory, I would suggest that they go to the mountains and gather crabapples, and not molest nature by trying to produce our luscious Spitzenbergs and Yellow Newtowns.

After your July pruning the first year, you should do no more pruning until the wood of the tree is well matured for the

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to four inches of the body of tree, as shown at "A," Figure 2. Always try to leave the stronger and longer stubs toward the prevailing winds; in fact, when setting the tree you should always set the heaviest side limbs toward the wind. This rule will hold good with either one or two-year-old trees. I much prefer to set a one-year-old tree, and under no circumstances would I set a tree older than two years, and I might add that in selecting your trees be sure that you do not get large, overgrown, with all lower buds rubbed or cut off in the nursery. Get trees which will have at least a dozen good buds lower than twenty inches from the ground.

In the cuts, as shown in this article, you will observe that each cut shows not only a tree of different age, but they are different trees—in fact, all were taken by the same photographer at the same

winter. I much prefer to do the next pruning in the springtime, but we are always governed by local conditions, hence, if in a climate where danger arises from heavy snow and sleet, I would make this next pruning about the first week of December; otherwise I would wait until spring. At this pruning I would cut main uprights, as shown at "C," Figure 2, and also remove all limbs that do not grow outward and assist in forming a well balanced head. I am a firm believer in heavy pruning for the first few years. I want a decently shaped tree as well as a tree strong and stocky enough to support its fruit.

Don't be overanxious about your trees not bearing early. When you have obtained a healthy and well balanced tree, with a strong and heavy framework, you need not worry about getting your fruit, for your troubles then will be how to make your trees carry their burden. In Figure 3 you will observe the pruning has been done and the tree is ready to take on the third year's growth. This is about the last year in which I would cut back strong and stocky varieties, except when necessary to obtain a shapely head to the tree. Our Newtown trees as a rule do not need the tops cut back after the third year, while our Spitzenberg trees should be topped at least two years later, and then about every other year for at least the remainder of the first twelve years' growth. Every successful orchardist must learn the nature of every variety of tree in his orchard, and prune accordingly, before he can become a proficient pruner. He must also take into consideration the climatic and soil conditions under which he is growing his orchard.

To those who may find objections to some of my ideas upon pruning, I desire to say that they are based upon our local conditions in Hood River Valley, and my experience is limited personally to two varieties, the Spitzenberg and Newtown. However, I have one tree each of six other varieties, and with a little diversion in pruning I am able to form very desirable open-center heads on all of them.

You will observe in all of my tree illustrations that the pruning has been done just prior to the beginning of a new year's growth. You will also notice that Figures 1, 2 and 3 all show a cutting back of the previous year's growth at terminal of limbs, and also a heavy thinning out of superfluous limbs. But

beginning with Figure 4, and thereafter, you will observe that my topping consists of cutting back only to lateral limbs, always cutting so as to leave the remaining limbs toward the prevailing winds. And I want to say right here that I can hold a tree in better shape relative to the



FIGURE 2—SECOND YEAR

wind by pruning intelligently than by any other method known to horticulture. Props, poles, anchor wires or ropes sink into insignificance compared with the pruning shears when you desire to build a beautifully shaped and stocky growing tree under unfavorable conditions. However, after you have built the above described tree then it becomes necessary to render nature some assistance in maintaining its abundant supply of fruit. How to do this I will describe later in this article.

Figures 4, 5 and 6 all show the development of the main structure of an apple tree. The pruning in all these is about the same. At each pruning I remove all superfluous limbs, as those growing inward or crosswise of tree, also those that are too close to other limbs, and which will later become a part of the framework of the tree. One of the most common errors made by the inexperienced orchardist in starting the head of an apple tree is to leave too many limbs for the lower framework of the tree. I prefer three limbs at base, and would prefer to have them distributed up and down the trunk as far apart as possible, but we cannot always obtain our preference, and have to be satisfied with what we can get. This is true in building an apple tree. Hence we may at times be forced to let four branches form the main framework for the head, but in all cases hold your first uprights as far apart as possible, and keep the center open and free from all limb growth. Sometimes it becomes necessary to sacrifice a part of one of the already established uprights by cutting it back to a lateral limb, so as to more evenly balance the head of tree and also to make a wider opening in the center of the tree.

In all of these illustrations you will observe that there has been many prunings compared with the age of tree. This is explained by my pruning twice a

year—in the middle of July and in winter or spring. I am confident that two prunings each year is by far the best. With young trees it enables me to obtain a tree of a more perfect balanced head in a shorter period, and also stimulates the growth of fruit buds on trees that are inclined to delay in bearing. However, after a tree has become large and is bearing nicely the pruning in summer consists in removing watersprouts, while in the winter months or early spring the grower can then cut out all cross or inward growing limbs, broken or injured limbs as well as an occasional limb which has become a nuisance by crowding some other part of the tree.

I have now told you how to build the framework and shape the head of an open-center apple tree, but I have not told you how I make it stronger and more desirable as well as more convenient than the center-stalk tree.

To those who are opposed to the open-center tree on account of it being weak and easily split down, either with snow, sleet or fruit, I will frankly admit that if we do not give nature some mechanical assistance in this style of tree that it is a failure compared with a center-stalk tree. But under our climatic and soil conditions in this valley, we are compelled to either use props or some other device to assist our apple trees in carrying their heavy loads of fruit, and it matters not of what age, or whether we have open or center headed trees. To do away with propping is one of the greatest advantages of an open-center headed tree. I have adopted a system of wiring which remains permanently in the tree without injuring it, and without a rival as far as natural or mechanical supports are concerned. Each main upright stalk is wired to a small ring in center of tree. See Figure 9. Each wire is fastened to a screweye, which is screwed into the main upright. This gives an umbrella system of supports and every upright is held in its natural position to be used as a framework, to which we support all outside limbs which are heavily loaded and require a support. The higher this interior wire system is placed the better, for it gives



FIGURE 1—FIRST YEAR



FIGURE 3—THIRD YEAR

a better opportunity to tie the outer and lower limbs. I use a twelve-inch galvanized wire, a half inch galvanized harness ring and a small eyed screweye about one inch long. In about three years the wood growth has about covered the screweye and only a small wire remains protruding from the main stalk. When these wires are put in carefully and in a neat manner it is there for a lifetime, and it matters not what kind of a crotch is at the base of tree, it is absolutely the strongest tree that can be constructed. Instead of a center-stalk tree with one main upright about six or eight inches in diameter, you have from four to eight uprights from three to four inches in diameter, and all of them arranged in a circular position forming a circle from three feet to four feet in diameter. This wire system should not be put in limbs smaller than one inch in diameter, and in order to get these wires as high as possible I have adopted a temporary support (see Figure 8) to be used for a few years until trees are taller and uprights larger.

If trees are early bearing varieties, or you are in a district where sleet and snow weights your trees during the winter, it is then advisable to add a temporary support to these trees which are too small to receive the permanent wire supports. Figure 8 shows a cross section of the main upright branches of a tree from four to six years of age which needs an early support. I encircle the main uprights with a system of separate loops of twine. You will observe that each limb is connected with each other limb next to it by tying the twine in a circular belt around both limbs. This gives each upright an opportunity to expand in growth without obstruction of sap flow, and also insures the uprights to always retain their correct position, and it matters not to what kind of stormy weather the trees have been subjected. I use a soft spun two-ply tarred twine, either Manila or hemp. Under our climatic conditions this will last at least three years, after which I put in the permanent wire support, as shown in Figure

7 and Figure 9. In Figure 7 one of my orchard men is standing on the wire system, which was placed there three years ago. The wires upon which he is standing are too small to be shown by a photograph. If you will look closely you may see some of the twine strings which



FIGURE 5—FIFTH YEAR

connect the side limbs to main uprights. These side limbs were heavily loaded with fruit last season. I use the same twine for tying the side limbs that I use for temporary supports, and I never remove a twine until it has become rotten or has broken.

The cost of placing the permanent wire system in each tree is about 20 cents, including labor and material. Compared with propping trees the tying with twine and supporting with wire is by far the cheaper method, less liable to injure the limbs and more safe in protecting apples from falling or limbs from breaking.

I believe I have given you some ideas that will assist you in obtaining an open-center tree, and I believe I should now give a few reasons to substantiate my ideal method of building an apple tree. An open-center tree, braced as I have outlined, is much stronger than the center-stalk tree. It provides better opportunity for sunlight and circulation of air, thereby producing higher color and better keeping qualities of the fruit on the interior of tree. It provides an open center which is a workhouse for my apple thinners and pickers. It makes it possible for me to get to the center of my tree on a bridge supported by two tripod step ladders on either side of the tree (which time and space forbids me describing here), and from this bridge my apple thinners and pickers can work without climbing out upon the limbs. It enables me to spray my fruit more thoroughly and holds the head of the tree in the best possible shape for self-protection against storms, heavy winds and heavy loads of fruit.

I could give many reasons why I prefer a low-topped tree, but I cannot impose upon your good nature at this time.

However, I must say something relative to the pruning tools. All tools that I want are a pair of small hand pruners, two long extension pruners (one eight feet and the other twelve feet) and a small pruning saw. I was somewhat amused when I noticed a picture in a back number of "Better Fruit" wherein it showed eight or ten pruners upon high step ladders trying to prune with short wooden handled pruners about two feet long. This represents, in my opinion, a waste of labor as well as very poor results. You are too close to limbs to make comparisons. When you work from the ground you are farther from the top, can better compare one side of the tree with the other, and hence can make a more shapely tree, and you can cut off twice as many limbs in half the time. If it is a cold day you can move around enough to keep from freezing.

One more thought on pruning, then I have finished. If it should become necessary to remove a medium or large sized limb, cut it close to the remaining stalk and cover the wound with good grafting wax. Please don't use paint. It is absolutely worthless as compared with wax, and is no cheaper. No end grain wound on an apple tree was ever painted that did not in a short time show small season cracks, and at the bottom of which the wood soon begins to rot. In my orchard I can show you end grain wounds five years old on some worked over Ben Davis trees that have not yet healed over, and the wood is just as sound as it was the day it was first cut. I re-wax the wounds each spring. These trees were eight years old when grafted, and many limbs from three inches to four inches in diameter were removed.

The wax I use is made as follows: One pound tallow; two pounds beeswax; four pounds resin; which melted together forms the stock solution, and, when using, thin with turpentine, according to weather conditions. If real cold it will require more turpentine, and if real warm it will need but little or no turpentine. Add turpentine by re-melting a part of the stock solution.



FIGURE 4—FOURTH YEAR



FIGURE 6—SIXTH YEAR

PRUNING AN IMPORTANT PHASE TO ORCHARDISTS

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THE best methods to pursue in all the phases of pruning have been worked out and published by many authorities. The merits of, and objections to, different practices have been dwelt upon, and the outcome of operations have been fully illustrated and explained. For the educational benefit of the great number of people who are just starting in to grow fruit, and to warn the experienced orchardist and pruner that it is his duty always to exercise the greatest of care in pruning, the frequent repetition of these principles is of value, and also necessary to promote the highest degree of proficiency in the work.

The pioneers have virtually proven the degree of adaptability of deciduous fruits to the settled districts of this country by their plantings of years ago, but from a lack of transportation facilities and the proper markets, fruit-growing as an industry did not pay at that time. Where trees succeeded without care then, they are now paying fair returns, while well managed orchards under similar conditions are paying excellent returns from their increased production.

There are two classes of people who are seriously neglecting their orchards, and many of them always will. Men who are accustomed to having a sufficient amount of fruit without pruning, spraying or cultivating their orchards are frequently very slow in recognizing the value of good care. There is also a class of men who are not adapted to the work of producing fruit. Such people have no real interest in the trees and their welfare. They farm mechanically and neglect many important things. To them pruning is a necessary operation that can be done by the cheapest labor obtainable. They fail to reach the proficiency in their personal work that is necessary for them to succeed in the present keen competition, and to keep their trees in proper condition for future success. Although this class of people might excel in other lines of work they do not make successful orchardists.

Some people still contend that nature should be allowed to take its course in orchards as well as in the forests. They maintain that pruning is an unnatural treatment, and consequently is harmful to the tree. Such ideas plainly show the possessor to be a poor observer, and most times his orchard does credit to his

fully reached by giving the tree an annual severe heading back and thinning out of all branches not permanently needed by the tree. This treatment should not be carried to excess, however, as is sometimes done by the over-enthusiastic orchardist, for the production of wood is likely to continue after the tree should be producing fruit. When the desired size and strength have been acquired heavy pruning should be abandoned and the tree given a chance to develop fruit-bearing wood, and begin producing.

From the time the tree begins to bear light annual prunings should be the practice. By such a treatment the correct shape is maintained and a heavy wood growth avoided. The result is usually a heavier production of fruit, with a uniform, evenly distributed wood growth, which is strong and of medium length. By following it up each year in a systematic manner the work is more easily accomplished, and a more uniform production of fruit is acquired, while occasional severe prunings stimulate a heavy wood growth, which comes at the expense of a few years of fruitfulness. This condition might be produced at any time by a severe pruning. The heavy production of wood is an effort on the part of the tree to re-establish the normal equilibrium between its top and roots.

Many old and neglected orchards can, by systematic and well directed work, be gotten into good condition, but they can never be made to acquire as high a standard of excellence as if they had been well cared for throughout their entire period of development.

Every individual tree requires treatment differing from that of its neighbor. This difference, however, is of no consequence to the experienced pruner as he knows how each should be treated. The close-growing habit, as is characteristic of the Rome Beauty and Northern Spy apples, and some varieties of pears, must be treated quite differently to the varieties having a wide and drooping habit of growth. Where per-



FIGURE 7—THIRTEENTH YEAR

lack of progression by being in very poor condition. One only needs to glance at a few up-to-date orchards to see what relation pruning has to the strength and longevity of trees, and to the size and excellent quality of the fruit.

The man who depends upon nature to do his pruning is but little, if any, better off than the individual who overdoes it. The most successful orchardist is he who prunes conservatively, but always attends to it at the proper time and sees that it is done correctly. While a puny growth and large percentage of small fruit is the usual result of insufficient pruning, a dense growth and coarse branches and a small amount of large fruit is the usual result of excessive pruning. Neither is desirable, and should be avoided. Cultivation and soil fertility influence the fruitfulness of trees, and pruning also exerts a strong influence upon it.

The training of an orchard should begin with the setting of the trees, and continue throughout its age of productivity. The first year might well be determined the most important of its life as related to pruning. Out of this season's growth should be laid the foundation, as it were, for future development. The head should be formed, and the framework started in such manner as to cause the development of a strong and symmetrical tree.

The first four or five years should be given entirely to developing a strong framework. This end is most success-

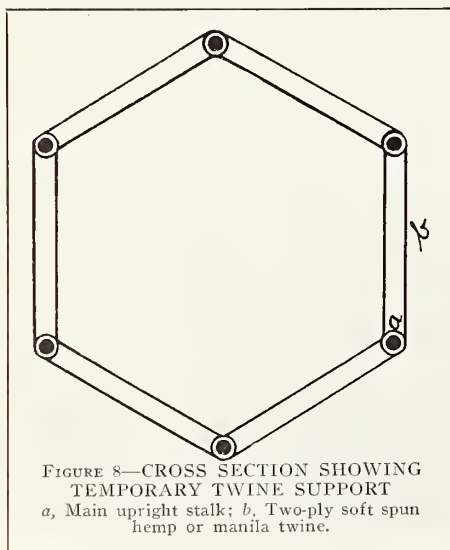


FIGURE 8—CROSS SECTION SHOWING TEMPORARY TWINE SUPPORT
a, Main upright stalk; b, Two-ply soft spun hemp or manila twine.

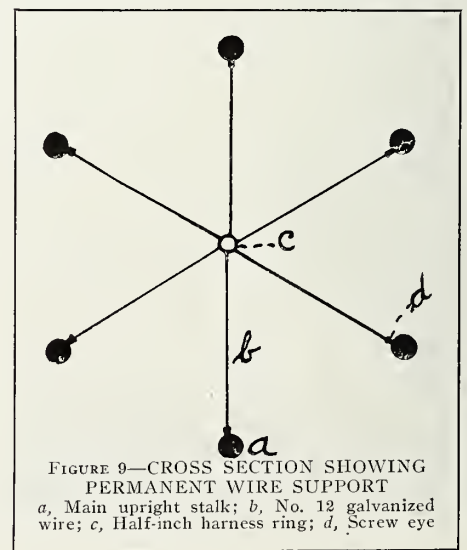


FIGURE 9—CROSS SECTION SHOWING PERMANENT WIRE SUPPORT
a, Main upright stalk; b, No. 12 galvanized wire; c, Half-inch harness ring; d, Screw eye

sistent work is required to make one widen out sufficiently, the opposite practice is necessary to keep the other from becoming too wide, and its lower branches from bending to the ground.

It is important to know where to remove the wood, and how the cuts should be made, to acquire the desired end. Although the common practice of cutting to buds which are located on the inside of the branches tends to direct the new growth, which starts from them, toward the center of the tree, or at least to somewhat less of an outward direction, the desired result does not always follow, as is also true with cutting the outside buds. The practice, to be successful must be followed with care in order that opposite extremes might not be reached by heavy cutting on the one hand, or the desired effect not being acquired by lack of a sufficient amount on the other.

Heavy pruning is best done during the dormant season, and, preferably, only a short time before growth begins. When done at this time the wounds are not given as long an exposure to the drying effect of the wind, so the branches are less apt to die back. Summer prunings should be moderate, and done early in the season to avoid causing too late a growth.

The fruiting habit of our orchard trees differ greatly with the kind, and each kind demands a special treatment. It is necessary to leave the older wood and fruit spurs in an apple or pear tree, whereas in a peach tree severe cutting is necessary to stimulate the growth of new wood upon which the fruit is borne, hence these fruits must be treated differently.

To be a successful pruner an individual must have a definite understanding of the requirements of a perfectly formed tree. He must know what treatment the tree requires in every stage of its development. A definite understanding must be had of the fruiting habit of our different kinds of fruits, and also the habits of growth of the different varieties of each. He needs, by practice and observation, to have learned where to cut the wood to get the desired results, and about what will be the actual result of every operation.

After having acquired a knowledge of the requirements of a perfect tree, and how to procure it he can develop accuracy and speed in his work. All this necessitates study, close observation and experience. To the man starting a young orchard a thorough knowledge of pruning is not necessary. If he studies, makes observations of what his most successful neighbors are doing, and notes the results, he will be able to learn the work well enough to handle his orchard properly as it grows up.

A man who is quick to observe the needs of a tree, and fast in his movements, will soon accomplish a great deal of work in a day, and can do it correctly. The most serious fault of the average pruner is that he lacks interest, or hurries along too much to do good work. By trying to outdo his neighbor in quantity of work he becomes "slipshod," and

should be classed as a poor workman. The adage, "Make haste slowly," can be followed to no better advantage anywhere, I think, than in pruning.

For the highest degree of success in growing an orchard the following qualities should be developed in the trees: Strong body, low head, three to five main branches so placed as not to form crotches, and far enough apart to not crowd when the tree becomes large. Branches well shaped and grown strong enough to bear up the crops of fruit with a minimum of propping. Top-roomy, with evenly placed branches far enough apart to admit plenty of light, to give room for workmen to get around while thinning and picking without knocking off the fruit and breaking the spurs.

for something better. Strong, light and clean cutting tools must be used, and they should be kept in the best condition, instead of receiving comparatively no care, as is many times the case. If not carefully handled the large pruning shears that are ordinarily used do very poor work. They split the bark when used on too large branches, and frequently do not make the cuts close enough to the main branches to facilitate their being rapidly healed over. A fine toothed saw should be used on many of the branches that are usually cut by these large shears.

An orchardist cannot be too careful in selecting a man to do his pruning, for a careless or inexperienced hand can do more damage in one pruning than an



C. E. WHISTLER, MEDFORD, OREGON, DIRECTING CREW OF PRUNERS IN HIS ORCHARD

Trees developed low in order to facilitate pruning, spraying, thinning and picking.

Crotches should be avoided whenever possible. Occasionally this is impossible, and when such a condition prevails the tree can be made secure from splitting down by making a natural graft between the main branches above the fork. The use of bolts is not advisable, as they are foreign to the tree and inflict wounds in it that frequently do not heal over in time to prevent decay of the wood.

Trees should be headed low, for those so grown shade their own trunks and prevent the cause of wounds by sun-scalding; they are not as severely affected by winds as are taller ones, they are much closer to the ground and are fully as easy to cultivate as taller ones, are easier to spray, to prune, and to thin and pick the fruit from. Low-headed trees, especially cherries and peaches, for the most part, make a much harder growth than those with a long trunk and remain productive throughout a longer period of years.

Much care should be exercised in selecting and caring for pruning tools. The implements which are on the market now are a great improvement over those that were in use a few years ago, but there is still room for a wonderful amount of improvement among them, and a person should be on the lookout

expert can overcome in several years; besides, not infrequently such people treat trees in such a manner as to cause them permanent injury in giving them a very weak framework or unshapely appearance.

All large wounds, whether made by pruning, breaking of branches or by cultivating implements, should be given prompt treatment. They should be trimmed up smoothly and treated to prevent the wood from decaying before it is covered over by the growth which closes in upon it from the edges of the wound. When decay starts in in the hard wood of a tree it is almost impossible to get rid of, for it spreads through the tree, and, if not stopped, it shortens its life quite materially.

A greatly increased amount of care is being exercised in the operation of pruning and the treatment of wounds of late, and the results are readily apparent. The present high degree of development in orchard practices, which have become so general within the past few years, stand out in bold contrast to the prevailing condition of a decade ago. This progressive development has come with the improvement of transportation facilities and methods of handling the fruit, and will perform as necessary a part in the future of the fruit industry as it has in the past development of it.

EFFECT OF FREEZING ON BUDS, BLOOM AND FRUIT

BY O. B. WHIPPLE, AGRICULTURAL EXPERIMENT COLLEGE, BOZEMAN, MONTANA. PHOTOS BY THE AUTHOR

THIS subject is closely associated with the subject of "Frost Protection," discussed in a previous issue, for one is really not equipped for frost fighting until he is informed as to the temperatures injurious to the fruit crop in its various stages of development. In orchard heating much fuel has been wasted by nervous growers starting fires when the fruit was really not in danger, and, on the other hand, much fruit has been lost because the danger point was placed too low. It is also important to be able to determine when the fruit is really seriously injured.

At the outset it may as well be said that it is impossible to name the exact minimum temperature to which a bud, flower or fruit in a certain stage may be subjected to without injury. No doubt other factors besides temperature have something to do with the extent of injury, but as yet the subject has not been thoroughly enough studied to determine what other conditions must be taken into account.

The plant is a collection of cells, each cell or group of cells having some particular function to perform. These cells are very delicate in their make-up, and are especially liable to be injured if dried out to any extent. During the process of freezing the moisture from these cells is apparently drawn out and frozen into ice in the air spaces between the cells. If the tissues thaw out gradually, this moisture may be again taken up by the cell and little injury follow. If the thawing is rapid, the moisture is evaporated and the cell is left dried to the extent that it will not recover. This is what has happened when we cut open the fruit after a frost and find the tissues discolored. The discoloration means that some of the cells have been killed. The length of time the tissues remain frozen, the varieties and kinds of fruit, and the rate at which the tissues thaw must at least be considered in addition to the temperature. No doubt other factors must also be considered in determining what temperatures are fatal.

Fruit buds of the peach, apricot, cherry and many plums are in danger of injury by low temperature from the time winter

sets in until all danger of spring frosts is past. Apple, pear, sour cherry and native plum fruit buds are seldom injured during severe winters. In late spring, after they have swollen, prac-

and a live at each end. The cherry twig carries only one live bud, the lower one on the left-hand side. It will be noticed that the live buds are much larger than the others. The dead cherry buds will open and expand their poorly developed leaves, but there will be no evidence of flowers. The peach buds injured in winter seldom open.

Stone fruits often suffer a great deal of injury just about the time they have opened far enough to show the color of the petals. Peaches and other stone fruits at this stage are generally injured when the temperature drops 10 or 11 degrees below the freezing point, or to 21 or 22 degrees. Figure 2 shows a peach twig bearing buds developed far enough to show the petals. The pistil of the upper bud was killed by a temperature of approximately 20 degrees, the other two buds escaped. Here the injury is easily detected by opening the bud. The pistil will appear small and blackened as in the upper bud, while the uninjured buds will appear like the two lower ones in the figure. The upper bud will still blossom out and appear all right unless you look closely for the pistil. As the bottom of the pistil develops into the peach, a blossom with a dead pistil cannot set fruit. The same is true of cherries and plums.

After the blossoms have opened, or after the fruit is formed, a few degrees of frost are generally fatal. It is doubtful whether a temperature of 30 degrees, unless of long duration, is really injurious to stone fruits at this time. A temperature of 28 degrees, if of very long duration, is almost sure to cause injury to most stone fruits at any time after the flowers have opened. Many American plums in bloom and after the fruit has set are not seriously injured by temperature as low as 25 degrees. Peach trees will sometimes escape with a good crop when the temperature drops to 26 degrees during the blooming season. But during the blooming period or after the fruit is set 30 degrees should be considered the danger point for all stone fruits. I have known of cases where



FIGURE 2

tically all fruit buds are subject to injury. The wood of many stone fruits is injured by severe winter freezing, but the fruit buds may be killed when the wood shows no injury.

The lowest temperature fruit buds will stand during the winter period depends upon the stage of development. During the early part of winter a temperature of 10 degrees below freezing point seldom injures peach, apricot, sweet cherry or plum buds. But at 15 degrees below freezing one may expect some injury to the more tender varieties of these fruits. When perfectly dormant sour cherries and some of our native plums are not injured by temperature at low as 40 degrees below freezing. At any time during the dormant season the extent of injury may be determined by splitting the bud. If the center is brown some of the flowers are killed. If the fruit bud carries a single flower, as is the case in the peach and apricot, it is killed as far as bearing fruit is concerned. In the case of plums and cherries, where most fruit buds contains two or more flowers, all these flowers may be killed or only a part of them. In the spring, after the buds have started to swell, the winter injured buds may be picked out on account of their being smaller than the uninjured buds. Figure 1 shows a peach twig and a sweet cherry twig bearing a large per cent of winter-killed buds. The peach twig on the right carries three dead buds in the center



FIGURE 4



FIGURE 3

peaches as large as a pea have escaped injury with a temperature of 24 degrees, while apple blossoms not twenty feet away were killed outright.

During the blooming period, or shortly before the buds open, the extent of injury is determined by an examination of the pistils. Within twenty-four hours after a freeze all injured pistils will turn brown and begin to shrivel. After the fruit is set, any discoloration, whether at the base of the pistil or in the well developed fruit, really means that the fruit is killed. Occasionally specimens showing injury in the germ part of the seed may continue to develop for some time, but they do not ripen normally. Many of them throw out drops of gum and fall off before ripe.

The earliest stage at which apple and pear buds are commonly injured is when the fruit bud has opened sufficiently to show the individual flower buds. The result of such injury is shown in Figure 3. The buds at "A" were killed by a temperature of 18 degrees. One flower bud escaped, and with the leaves it has continued to develop, but the buds at "A" are still at the same stage of development as when frozen. A temperature of 20 degrees should not be considered dangerous to flower buds of apples or pears the size of those shown at "A". But each day in the development of the flower bud brings the danger point a little higher. The bud shown at "B" is now well enough developed to show the color of the petals and would be in danger of injury at a temperature of about 24 degrees. If one has reason to believe that buds the size of those shown at "A" have been injured, the final test is to section them lengthwise. If the interior is discolored they are dead, and may soon be brushed off. If flowers as large as the one at "B" have been injured, the extent of the injury may easily be determined by grasping the petals between the thumb and finger and pulling them off. This exposes the other organs of the flower. Protruding from the center of the flower one will find five slender organs without enlargements at the end. If these are fresh and stiff, the flower is almost certain to be uninjured. If discolored, the flower is killed. Blossoms of apple and pear may open after these five central organs are killed, but they cannot set fruit. Always examine the central flower of the cluster, for it most often suffers. But if it is killed some of the others may be uninjured, and will set fruit.

During the blooming period, or after the fruit is set, a temperature of 28 degrees should be considered dangerous to the apple or pear crop. There are

times, however, when apples or pear trees escape with a full crop when the temperature drops to even 25 degrees during or after the blooming period.

Figure 4 shows apples in one of their most tender, if not the most tender stage; the petals have just fallen. After the fruit is set it is not so easy to determine when an apple or pear is fatally injured. In the case of the pear the discoloration of the flesh may extend almost to the skin, and still the fruit will mature. The seeds and the tissues surrounding them may be killed without killing the fruit.

Figure 5 shows a pear that has had the core and seeds killed; the two smaller ones are from second-crop bloom. This pear will mature, but as all the growth will take place in the part that would have normally been the neck, the fruit will have an abnormal shape like the one on the left in Figure 6. This figure shows a normal Bartlett in the center,



FIGURE 5

with a fruit from second-crop bloom on the right and the frozen one on the left. Both the frozen pear and the one from second-crop bloom are ill-shaped, and hardly marketable. Any discoloration in the flesh of either the small apple or pear, especially if of any extent, means that the fruit will be abnormal in shape. The safest way to determine whether injury will prove fatal or not is to split the small fruit lengthwise, five or six days after the freeze, and note the color of the flesh at the base where the fruit attaches to the stem. If this flesh begins to turn yellow the fruit will soon drop.

Figures 7 and 8 are of apples injured when about the size of one's thumb. They only happened to be injured on one side. Notice how one-sided the specimens are, and notice the discolored tissues still showing in the section of the apple in Figure 8. Such apples are, of course, unmarketable. Wherever discoloration takes place it stops the growth of the apple in that direction. Injury is more common at the calyx end, and the fruit in this case is abnormally short.

Figure 9 shows how frost sometimes injures the skin of the apple, causing it to russet. This sometimes takes place when no other injury is noticed. The russet may appear in either the calyx or stem-end, or as a band about the center of the fruit.

In Figure 4 notice the crumpled leaves which are another result of frost injury, commonly known as frost blister. The



FIGURE 7

leaves that have opened since the frost are normal.

Nearly every fruit-grower who has passed through experiences with late spring frost has noticed that fruit trees sometimes throw out a second crop of bloom after the first crop is killed. In the case of the apple this late bloom will develop into first-class fruit, providing the season is long enough. The fruit is later in maturing than fruit from normal bloom, possibly two weeks. The most common type of late bloom in apple and pears is that shown in Figure 10. They spring from the axil of a leaf, below the normal flower. In the case of apples, others spring from the larger branches and from auxiliary buds on one-year-old wood. Pears from these late blossoms are seldom normal in shape, and unless plentiful, are seldom worth taking care of. Small Bartlett pears from such blooms are shown in Figure 5.



FIGURE 8



FIGURE 6

A PRACTICAL METHOD FOR TOP GRAFTING TREES

BY H. E. VAN DEMAN, U. S. DEPARTMENT OF AGRICULTURE, WASHINGTON, D. C.

[Editor's Note: This article is reprinted, upon request, from the issue of April, 1910.]

THERE are many thousands of fruit trees, especially apple trees, of bearing age in the orchards of the fruit regions of the West that need to be grafted over to better varieties. In looking over the orchards of the Yakima and Wenatchee Valleys last fall I saw some grafting that had been done, and none of it was what I would call even passably well done. There were branches grafted three and four feet from where they forked, and reminded me of boyhood days when we walked on stilts. And there were scratches, scars, dead snags and masses of sprouts about the grafts in many cases. Such work is very bad in these valuable orchards, and I will try to show a better way.

For cutting the larger branches a good pruning saw is the proper tool. The grafting knives we see pictured in the books are not nearly so good as one made of a much plainer pattern. The blade should be about three and a half inches long, three-quarters wide and one-eighth thick, with a handle not over four inches long. The metal should be the best of spring steel, or an old file will do if it is first ground smooth. The metal should extend the full length of the handle, so that it may be of good strength. The blade end should be drawn to a sharp edge and the square point likewise drawn to an edge to be used as a wedge or lever in opening the stumps for inserting the scions. A hardwood club about ten inches long will serve as a mallet to drive the blade in splitting the stubs. A very sharp knife for trimming the scions is needed, a pint cup for holding the scions, and a shallow basket with a good handle for holding the tools and scions while doing the grafting.

All grafting done above ground must be waxed most carefully to prevent the escape of moisture. There are several good ways of making the wax, but about

the best for ordinary temperatures is made from one part tallow, two parts beeswax and four parts resin. Another good formula is, one part tallow, one part paraffine and six parts resin. These proportions may be varied a little to suit the different temperatures. It can be made much harder by using more

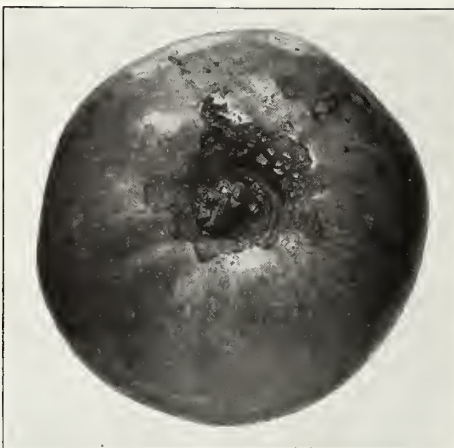


FIGURE 9

resin, and apply hot with a brush from a small pot in a little charcoal furnace.

Wood for grafting should be of the last year's growth, but that of any age with healthy buds will grow. The larger and plumper the buds the better the wood, provided it is well matured and hard. Such wood is usually found near the tops of trees or well out on the side branches. It must never be allowed to dry out in the least or its vitality will be lowered.

Never attempt to graft weakly or stunted trees of any age. If they are vigorous the age makes no difference. Apple and pear trees are easy to graft, but peach, plum, cherry and apricot trees are not so easy, and they are better to be budded to change their tops. Nut trees are still more difficult to graft.

One of the main points in grafting is that the scions should be set in the branches that have the most vigor, and this should be well in mind before a single one is cut. These are usually in the center of the top and on the sides, if the tree has a nominally shaped head. Strike for the leaders first. Cut them back to within six or eight inches of their junction with the main stem or where they unite with other branches. Get the new growth well down; not out on the tips of the branches. Do not cut branches over two and a half inches in diameter. Rather go higher and graft two or more branches above the fork, because large stumps are difficult to heal over. Always make the cuts diagonally across the branches, at an angle of about forty-five degrees. Never make square cut stumps, for they rarely heal over for several years, and often have ugly dead places. Clip off the point of each stub with a knife sufficient to make a place to set the scions, and never set more than one in each stub. The illustrations show

how all this should be done. Such wounds will heal over quickly and smoothly, and sometimes entirely, the first year. If the stocks are very vigorous this often occurs. Two or more scions in one stump cause ugly and undesirable forks.

The most popular method of grafting trees of bearing age while they are dormant is the cleft style. It should begin as soon as freezing stops in the spring and continue until the buds begin to swell, when the bark graft can be used. The stumps having been cut as before described, beginning at the top of the tree and working downward, they should be split with grafting knife through the center. In driving the blade down with the club mallet, care should be used to have it lower on the side where the scion is to be set than on the other, that the edge may cut a smooth place for the scion instead of tearing the bark open. A small lot of scions should be trimmed ready for setting and put in the cup, in which is a little water to keep them fresh. Three inches is about the right length for the scion, with a bud at the top and another an inch from the bottom. The trimming must be done with a very sharp knife, making a long, smooth, tapering cut on each side of the bottom bud about an inch long. The edge of the wedge thus made should be thickest on the side next the bud, so it is sure to fit tight when inserted in the stock. The trimmed scion is shown at "b" in Figure 1, and a cross-section of the wedged part at "c." With the point of the grafting knife thrust into the split in the top of the stump and used endwise as a pry, the scion may be carefully put in place. The cambium of stock and scion should be brought together, for this is the place, and the only place, that vital union can be made from the cellular growth. Too much care cannot be taken on this point, for on it depends the success of the whole operation. The bud at the top of the wedge should be at or a little below the top of the stub. At "a" in Figure 1 the scion is shown properly set.

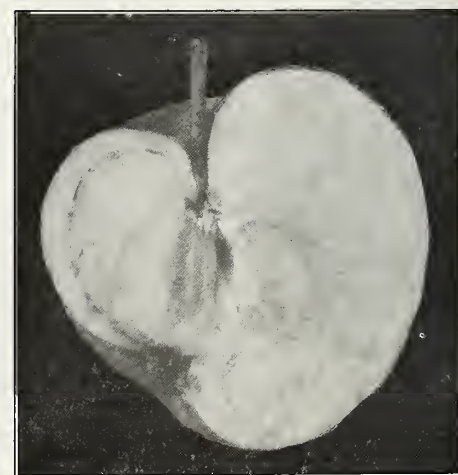


FIGURE 8



FIGURE 10

An excellent way to graft small trees or branches is by the splice method. This is very easy to do, and yet it requires a skillful hand to make the cuts just right. The knife must be very sharp and with a strong handle that can be securely gripped. With a steady hand make a long, loping cut that severs the branch to be grafted. One-third the distance from the point of the stub thus made make a downward slit about half an inch deep, forming a tongue as is shown in Figure 3 at "a." Make similar cuts on the butt end of the scion, as at "b." Endeavor to have the wood from which the scion is cut of the same diameter as the stump, so they will match on both sides when put together, as at "c." This, however, is not essential, for if the scion is quite small it may be set to one side of the stump, and will grow very well. But the better the fit the better the chances for the cambium layers growing together, which is the vital point. The splice should be tied firmly with a small cotton string that will break easily as the growth begins, and then all waxed over.

After the bark will peel and up to the time the leaves are full size, grafting may be done by the bark methods. One of them is shown in Figure 2. The stump is cut off as for the cleft graft, but it is not split. Only the bark is slit with a knife on the point of the stub. The wood should have been kept dormant in some sort of cold storage, as in the sawdust of an ice house, until needed for this operation. Cut the scion the same length as for the other methods, about three inches, and trim them from one side

only and to a long, sharp point. Insert the point where the slit is made on the stub and push it down about the full length of the cut. Tie it firmly to the stub with a string and wax over every part of the wound.

It is advisable to have a helper to do the waxing, rather than for the grafter to daub his hands with the wax and the tallow that is necessary to keep the wax free in the hands. Every part of the wound should be covered perfectly, but

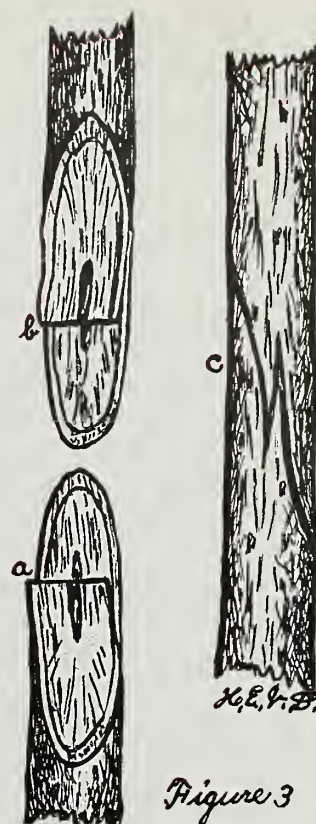
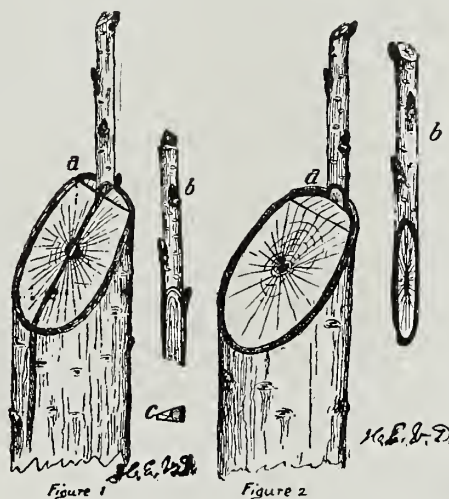


Figure 3

the coating need not be very thick. Inexperienced waxers usually apply too much wax, which is wasteful. A little lump of tallow should always be at hand, but some use water to prevent the hands from becoming sticky. Warm water is sometimes needed to warm the wax, or a charcoal pot, when the weather is cool,

but the warmth of the hands is usually sufficient to keep it in workable condition. The waxer must be exceedingly careful lest he displace the scions in climbing about the tree. The success of the entire job depends upon the manner in which he performs his part of the work.

A GROWER'S OPINION OF PRUNING THE ORCHARD

BY J. R. SHEPARD, ROOSEVELT, WASHINGTON

SO much has been said on the subject of pruning that there would be no excuse for anything further were it not that it ranks with cultivation and spraying in importance in orcharding, and that there is emphasis in reiteration. So no one need expect anything new from me. Indeed, I doubt if anything new has been added since the Lord God planted a garden eastward in Eden and put the man in it to dress it and to keep it. The land boomer has said it all when he describes his district as a "Perfect Eden," yet Adam lacked the modern two-way-extension-corrugated-spring-toothed-cut-away cultivators, and certainly had no need for a spray pump; so he made his reputation as an orchardist with the knife and saw (or was it his thumb-nail?) From that day on, wher-

ever the knife and saw have been applied vigorously, whether in the moral or vegetable world, fine growth and good fruitage has resulted. As an old neighbor in Polk County used to say, "Cut away the meanness and give the good a chance;" and he might have added, "You will be surprised when you see how much good was waiting for a chance." By the way, there is an argument for "Oregon Dry in 1910." Cut away the liquor traffic, and give its force and energy to something better.

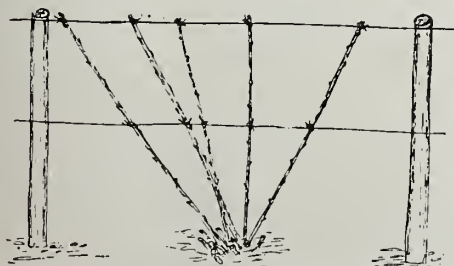
We prune a tree from the day it is set out, a tiny whip five feet long, and as thick as your finger, until it has ceased to bear. There is never a year when it is not profitable to prune; some years lightly, to be sure, others most vigorously.

There are many theories followed in pruning—low and high heading, vase-shaped, or limbs radiating from a central trunk, summer pruning and winter pruning, etc.; but the only man who fails utterly is the man who, fearing he may follow the wrong method, doesn't prune at all.

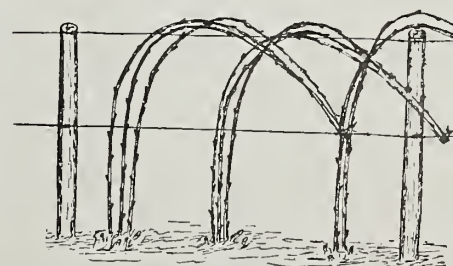
If you are planting a young orchard decide from local conditions the height you want your trees headed. In a section of high winds head low, and in almost all other sections do the same. Before the days of extension cultivators

we headed much higher than is now customary. The arguments for low heading are numerous: Your tree is down near you, and, therefore, easier to prune, thin, spray and pick. There is less body, therefore less area for sun scald, freezing, disease and pests. The fear that you cannot get near your tree for cultivation is needless. Prune for sturdy, strong lower limbs, rising at an angle of from 50 to 60 degrees, with no lower laterals sweeping the ground, interfering with plow or cultivator. Cut back your tree just set out to from twelve to eighteen inches, leaving several buds for your foundation limbs.

Let me suggest here that the demand for extra high trees has, apparently, caused nurserymen to seek to produce them at the expense of caliber. Crowded



GOOD WAY TO SUPPORT THE CANES OF SMALL FRUITS IN WINDY LOCALITIES



ONE WAY OF HANDLING TWELVE-FOOT CANES OF RED RASPBERRIES

nursery trees will do this, and buds will tend to develop high. Do not ask so much what is the height of the tree, as, what is its caliper? has it good roots? and are there good buds low down?

In handling before setting out use great care not to injure the lower buds.

As a general rule pruning will always be done in the dormant season in winter. Formerly I did no summer pruning, but I am of the opinion now that where trees have made a vigorous growth, June or July pruning is an advantage, in young orchards. It opens up the head of the tree, allowing free passage of wind, the wound will proceed to heal over at once and unnecessary wood growth is saved. This must be done with caution, for summer pruning tends to produce fruit, and winter pruning wood. Overcrowded trees ought to be forced to bear young and heavy, rather than spend their energy in producing wood that must needs be cut away because of their overcrowded condition. I have always contended for more space—fewer trees to the acre—and do not like the logic of a friend, who said, "Yes, I've set my apple trees twenty feet apart. I live in the twentieth century, the age of electricity. I want to bring my trees into bearing early, get all all I can out of them while I'm on deck, and let the future take care of itself. If I set my trees twenty feet apart I get one hundred and nine trees on an acre, while I only get forty-eight trees if set thirty feet apart. Up to the thirteenth year my trees bear as much per tree as yours, and I have more than double the number. My land cost me \$350 per acre, and the interest on the investment compels quick returns. By heavy summer pruning I will hold back the size of my trees and force early bearing. I do not want peach fillers—too much frost in my neighborhood, and cherry and pear fill-



SLASHING BEFORE TREES HAVE BEEN SPLIT OPEN. NOTE THE MEN ON EACH END OF TREE, 180 FEET APART

ers live as long as apples. No, the only filler I want is more apples." Before I could gather my wits for a reply, a bystander remarked that he had once ruined a promising young horse by overworking it when two years old. "I would rather leave my children a vigorous, fine apple orchard twenty or thirty years old than anything else," said. "But my land cost me less than a third of what you paid, and that may make some difference." I repeat this conversation to illustrate the fact that local and special conditions should determine in a great measure the method of pruning an orchard. There are no hard and fast rules to go by.

The orchardist should be both an artist and a mechanic. As an artist he should be able to fix in his mind the ideal tree he desires, and as a mechanic to prune to that ideal. In forming the ideal tree quite a number of problems must be considered:

Throw strong limbs toward the prevailing winds. This you can do by removing laterals and weaker limbs, and shortening the limb you want to leave. Long, willowy branches will yield to the wind. Never leave a stump in removing a branch, but cut close to the limb that it may heal over quickly. Space your limbs; two or more should not start from the trunk at the same height. Where a good growth has been made cut back freely just beyond the particular bud you wish to form the terminal branch the following season. Do not crowd your branches; let the sunlight and air in. Remember, that a limb whose growth is almost parallel with the trunk will in time split off; do not leave it.

Nature has decreed that the roots, trunk and limbs of fruit trees shall outlive the branches. The peach tree is a notable example of this. Fruit deteriorates as the branches grow old. When this occurs remove the branches, grow a new top, and the result will be the magnificent fruit of youth. Many of our old prune orchards particularly, that are now bearing inferior fruit, may thus be speedily rejuvenated.

In a properly brought up orchard you need never remove a large limb. Somewhere in history I have read of a nation that allowed slavery to flourish until it became a large limb, indeed. It was pruned off, but the wound has not yet healed over. It should have been nipped in the bud. What I have said has been intended for no special variety, merely a few thoughts applicable to fruit trees generally.



NEAR VIEW OF SAME SLASHING. STUMP SIX FEET NINE INCHES THROUGH

SOME EXPERIMENTS IN CLEARING ORCHARD LAND

BY J. C. MAC INNES, SUPERVISING DIRECTOR OF THE MT. ADAMS ORCHARD COMPANY. ILLUSTRATIONS BY C. C. HUTCHINS

SINCE October, 1909, we have cleared nearly three hundred acres of timbered lands to be set to orchard for the Mount Adams Orchard Company of White Salmon, Washington. While doing this we have made a number of experiments, but in this article we shall write only of those methods that we have found most practical and efficient. The average cost of clearing and plowing has been about \$60 per acre. Some of it we have cleared for less than \$40 per acre and some have cost us a full \$100. The cost is determined largely by the number and size of the trees per acre. As we have five hundred acres yet to clear we shall welcome any suggestion that will be an improvement on the methods we are now using.

Topographically the land is rolling; and covered with a growth of fir and pine trees running from three to six feet in diameter, with a secondary growth of the same kind of trees from a few inches to a foot through, and an undergrowth of willow, hazel, vine maple, wild cherry and a kind of laurel brush. We are too far from a sawmill to utilize the logs, so that all of these must be burnt up. The soil is a deep, light volcanic ash, and from fifteen to twenty feet to the subsoil of a light colored clay. As we expect to grow our fruit without irrigation we must employ thorough cultivation from the start to conserve the moisture, and unless the land is well cleared of all roots and stools this is not possible without danger to the young trees. We are fourteen miles from the town of White Salmon and all our supplies must be hauled out by wagon, which increases the general cost.

In all our work of clearing we keep constantly before us two main objects, thoroughness and economy. By thoroughness I mean that we endeavor to get out of the ground all roots, stubs and stools to the depth of twelve inches

at least. To obtain the best results in cultivation the ground must be free of all debris, roots and stools, and the time to do this is when the men are grubbing

and lay all the big trees on top of this brush or kindling. We endeavor to cross the trees. These are followed by axemen, who limb the fallen trees, leav-



A FAIRLY GOOD BURN. BURNT OVER IN OCTOBER, AFTER A HEAVY RAIN

the land with the stump-puller and immediately after the breaking plow. One has to keep close watch on the men to accomplish this, as they are inclined to hurry the work of the stump-puller by cutting the roots a few inches under the ground.

We have found that the heaviest expense in clearing land is manual labor, and that the greatest labor-saving device ever discovered is timeliness and system. There is a season when each operation in the clearing may be done to the best advantage and at the least cost, and where we can we plan our work months in advance. Both of these, timeliness and system, make for economy.

The first operation is that of slashing, and the principal aim in slashing is to get a "good burn." We early found that a poor burn is a large item of expense. The half burnt rubbish has all to be gathered up, and the partly consumed or charred trees bucked into convenient lengths to be handled by a team and all piled to be burnt over again. This would not be so bad if they would burn when they are piled up. But after burning for a time they go out and all must be piled again. It is difficult, tedious and almost endless task to get rid of these big logs. A large tree will burn more quickly from the heart to the bark than from the bark to the core. In slashing we have our men imagine that they are laying a fire. First we lay the kindling. The men go in with axes and cut down all the brush and all small trees up to twelve inches through. Then our timber fallers follow with the saw

ing the long bare trunks. The next step is one that saves us considerable money in our clearing—that of splitting open the trunk of the trees their whole length with powder. As this is not generally done I will go into the details of this operation.

We use a 1¾-inch ship auger, with which we bore holes every ten feet or so along the whole length of the tree, and to the center of the trunk. The ship auger is much better than the common wood auger of the same diameter, as the long screw forces the cuttings to the surface, and the 1¾-inch bit makes a hole large enough to admit a dynamite cartridge without breaking it up, and enables one to concentrate the charge. These holes are not bored straight up and down but at an angle of twenty or thirty degrees to the perpendicular dia-



A STUB EIGHT FEET THROUGH THE BASE
Sixty sticks of No. 2 dynamite, three holes



THE EXPLOSION FIRED WITH BLASTING MACHINE

meter of the tree. This prevents the charge from blowing out or straight down, and is more apt to split the tree. In loading, if the butt of the tree is five feet through, we put in from one and one-half to two sticks of dynamite and gradually reduce the amount as the circumference of the tree grows smaller. By using electric fuses we are able to connect all these charges and fire them simultaneously with a blasting machine. We do not try to shatter the tree, but to split it open from four to six inches so that it may dry out and the fire get at the inside of the tree. After blasting the trees we give the slashing all the time possible to get dry, and to this end we start our slashing as early in the spring as convenient.

When we burn we first start the fire in the center of the slashing, and when burning briskly start the fire all around the edges. This creates the draft toward the center and away from the standing timber, lessening the danger of forest fires and making a much intenser heat. Of course we take every precaution to prevent the fire from spreading, but during the month of August we burnt several large slashings and were never once in danger of the fires spreading. By following this plan we have burnt trees five and six feet through and over one hundred and twenty feet in length, so that there was practically nothing left. A few experiments with this method will soon demonstrate its advantage in securing a good burn.

The next step is to prepare for the stump-pullers. This we do by gathering up all the debris and burning it. We get the ground as clean as practical so that all stools that have been burnt even with the ground may be in evidence. Our powder man then goes in and splits all stumps from one to two feet through. The larger stumps we have found it more economical to allow to remain, as they make good anchors for the stump-pullers and it is best not to try to blast the big stumps until the ground is thoroughly saturated with moisture, as it then takes less powder to do the work.

At first we used a team of horses for each stump-puller, but later we found that we could do efficient work with one horse. Any stump or stool that one horse cannot pull it is cheaper and there is less danger of breaking the machine



AFTER THE STUMP PULLER. NOTE THE LENGTH OF THE ROOTS

or cable to use a little dynamite. We use the No. 2 Faultless Stump Puller, and instead of the usual length of anchor cable we use from fifty to one hundred feet. By gradually letting out this anchor cable we can pull a larger area from one setting up of the stump-puller. The extra cable soon pays for itself. We start near the machine and gradually work out the full length of the drum cable, and then work back to the machine. When we have pulled everything within the length of the drum cable we then let out the anchor cable and take another arc. An axe and grubbing mattock are always at hand to take out the stuff that is too small for the stump-puller to bother with and thus clean up as we go along.

On our land there are a great many spreading stools of willow, hazel, vine maple and laurel brush. For these we use the hook that is shown in the illustration. These stools have a thick cluster of roots and it would be expensive to grub them out by hand, as the chocker of the cable has little effect on them and does not pull them clean. This hook sucks down into the ground, gets under the stool and lifts out the entire root system. We have found this hook to be of great advantage to us. They are made at our local blacksmith shop. After experimenting with different materials we find that the best grade of tool steel 3x1 inches to be the most satisfactory and serviceable. The bars are three and one-half feet in length, and three lengths are used for each hook. They weigh about one hundred pounds and cost \$30 each. The general form as shown in the illustration give the best results. Our object was to get as great a suction and lifting power as possible. The first application of force sucks it into the ground and under the stool,

then as the force increases the shank is raised, which gives a strong lifting power to the hook. Where there are many clusters of roots to be taken out of the ground this implement is invaluable.

After the stump-pullers have taken out all this secondary growth and all stools and roots the debris is allowed to lie scattered on the ground to dry out. Some pile the rubbish as soon as it comes from the stump-puller, but we do not find that it dries out so quickly, nor burns so readily. This debris we gather up on low wagons, pile and burn it. All that is now left on the land are the large stumps to be blasted out at the proper season.



THE GRUBBING HOOK



THE RESULTS OF THE EXPLOSION

Note how the part on the left has made a half turn. All pieces are upheld solely by their own weight.

While blasting powder is expensive, yet we find it much cheaper than manual labor. At first we tried the scheme of shattering the stumps and then trying to burn them out with the small stuff. While we did not use so much powder we found, however, that very often the center of the stump would burn out, leaving a shell with most of the big lateral roots still in the ground. In such a condition it required considerable labor and powder to get rid of this shell and the roots. Now we endeavor to blow the entire stump and its roots out of the ground. As our soil is a light volcanic ash we find that the forty per cent dynamite gives better results and at less cost than the twenty per cent Hercules stumping powder. The forty per cent is quicker in its action, and in our soil seems to have a greater lifting force, as the holes left after the blast are not so large.

In blasting the large stumps we use the electric fuses and blasting machine. Under a stump we put down from three to five holes, according to the confirmation of the root system and the size of the stump. We dig these holes deep and toward the center of the root system. If there is a tap root as in the pine stumps we get a hole on each side of it, where we put in the heaviest charges. If there are lateral roots we put a small charge under these also to a depth of three or four feet. We then connect all these charges and fire them simultaneously with the blasting machine. We have found the blasting machine more economical and efficient than the blasting caps and tape fuse. We can throw out the same size stump with from one-quarter to one-third less powder, for the reason that all the holes being fired at one time gives one strong shock instead of a number of small successive shocks, as in blasting with caps and tape fuse. The electric fuse is also cheaper. An



PLOWED LAND IN THE FOREGROUND. LAST PREPARATION FOR THE BREAKING

electric cap with four feet of fuse wire costs two and one-half cents, while the blasting cap costs eighty cents per hundred and tape fuse seventy-five cents per hundred feet. This makes a cap and four feet of fuse cost three and eight-tenths cents as against two one-half cents. Where we use five holes there is a saving of five and one-half cents on each stump on the caps and fuse alone. There is also a considerable saving in time, especially where the men and teams are forced to get out of the range of the blast. The instant that the operator pushes down the "rack bar" the blast is exploded. Then, too, the danger of a premature or delayed explosion is much less. If one has but ten acres of stump

land to clear a blasting machine with its appliances will prove a saving proposition.

After all the large stumps have been blown out we dig out all the roots and stools that have been overlooked, and all rubbish is carefully gathered up and burned, and the field turned over with the breaking plow.

There yet remain the large holes caused by blasting the big stumps to be filled and the ground smoothed over. Some of these holes are from eight to twelve feet across and from four to six feet deep. We have found that it is cheaper and quicker to fill these after we have plowed, as the plowing gives plenty of loose dirt to fill in with and level off. For this purpose we constructed a large drag. We took a plank three by fourteen inches and twelve feet long. Along the lower edge of this plank we bolted a bar of iron four by three-eighths inches, sharpened along one edge. Two feet from each end and at right angles to the plank we mortise a two by four, which runs back about nine feet. Across these we fasten two boards two by twelve, on which the driver stands. These keep the plank upright and make it easy to dump. To each end of the plank we hitch a team of horses with log chains not too close. The teams work on each side of the hole to be filled and by going around the hole soon fill it up. We found this plan much quicker and less costly than the road scraper. After filling the holes we spring tooth the plowed land, then we drag this scraper up and down the field and across; this fills in all ruts and smooths the surface. We are now prepared to go over it with the spike tooth harrow and the field is ready for the trees.

We realize that the methods above given are crude and obvious. One feels almost ashamed to submit them for pub-



THE SAME FIELD WITH BREAKING PLOW AT WORK. MOUNT ADAMS IN FOREGROUND

lication. But it is the little savings that reduce the cost of clearing land, and a system helps to save time and money. To plan the work well in advance, to study the best time to perform each operation in the work will aid in keeping down the cost. One must study carefully the conditions of the land he wishes to clear, and especially the nature of the soil. What is successful in certain soils and conditions may have to be modified under different conditions. We have investigated and experimented with the donkey engine, the charpitting method and the force draft burning machine. They may be successful in some places,

but they do not do the work for us. The slow-acting stump-puller and a liberal use of powder do the work thoroughly and at the least expense. In each stump and fallen tree there is more than enough energy stored up to consume itself and clear the land. Some genius will yet find a method of using this energy to clear the millions of acres of logged-off land and primeval forest, and thus prove himself one of the great benefactors of the race. But until this discovery is made we must use the crude and costly methods that we find most efficient to meet the conditions under which we work.

THINNING FOR HEXAGONAL SYSTEM OF PLANTING

BY EDWARD G. MERWIN, PORTLAND, OREGON

IN studying the various orchard planting systems as published in horticultural literature I find that in describing the hexagonal system all writers agree on two points; first, that it is the best system, as giving an equal distribution of air, light and soil; and, second, that it is the most unsatisfactory system to thin out. Professor Lewis of the Oregon Experiment Station, in Bulletin No. 99, writes that "There is only one way that it can be done satisfactorily, and that is by taking out every other row, and then removing every alternate tree in the remaining rows. The result will be a hexagon twice the size of the former one, which might be unsatisfactory. For example, trees set twenty-six feet would then be fifty-two feet, which is an abrupt jump. * * * In no other way can the hexagonal be thinned."

There is, however, another way which seems to have escaped the attention of all, at least I have never seen it mentioned in print, whereby trees set twenty-six feet would then be forty-five feet, and all still be equally distributed.

The system I propose is simple enough when once understood, yet at first glance

would seem complicated. It is similar in plan to thinning the rectangular or quincunx system, where the center tree of a square is removed.

I remove the center tree of a triangle.

The hexagonal system of planting consists of a series of equilateral triangles, with a tree at every point of a triangle, and every tree equidistant from every other tree.

Suppose, for example, that we wish our permanent orchard trees to stand thirty-five feet apart, but think best to use fillers while they are reaching maturity, how shall we lay off our orchard on the hexagonal system?

Referring to Figure 1 of the diagram, we will say that the larger triangles, represented by the solid lines, are thirty-five feet on a side. Then we will set a tree in the center of each of the large triangles, and we have a series of smaller triangles, represented by the dotted lines, whose sides are twenty and one-fifth feet.

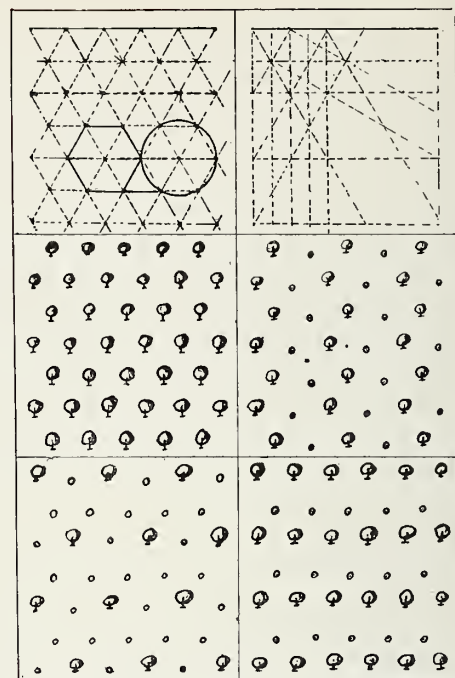
Our orchard, when first set out, will appear like that in Figure 2, with every tree twenty and one-fifth feet from its neighbors.

To thin this orchard we have but to remove the center tree of the larger triangles. In the orchards now growing the difficulty will be to determine which trees to leave and which to remove. In new orchards planted with this system of thinning in view the permanent trees can be of a different variety or species, or they can be marked in other ways.

Figure 3 of the diagram will give a clear idea of the trees to be removed. The permanent trees are marked "P" and the filler trees are marked "F." A study of the figure will reveal the fact that two-thirds of the trees in every row will have to be removed.

To proceed with the thinning, start with the first row. Leave the first tree, remove the next two trees, leave the fourth, remove the fifth and sixth, leave the seventh, and so on. On the second row remove the first tree, leave the second, remove the next two, and so on. Proceed with the third row as with the first.

It will be seen that if the thinning is properly done, the permanent trees will be directly opposite the space between the two trees that were removed in the previous row. This will be a check on the work.



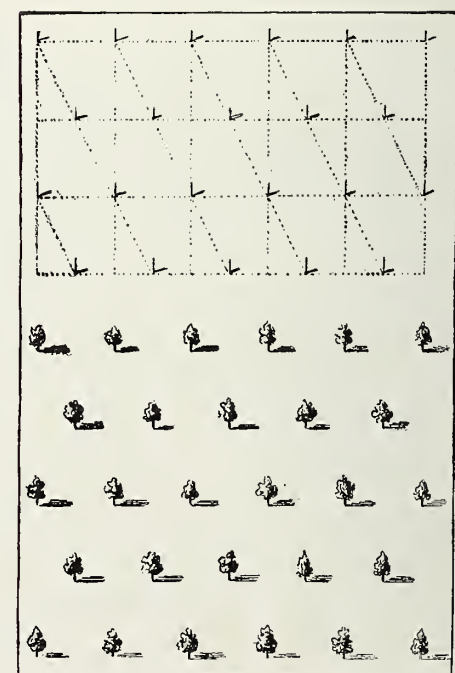
HEXAGONAL SYSTEM OF PLANTING

1, Field staked by use of triangle; 2, Field set; 3, Field properly thinned; 4, Field partly rowed off by running lines; 5 and 6, Improper thinning.

It is easy enough to mark off on a diagram the permanent trees, but out in the orchard, where only a few trees can be seen at a time confusion is liable to result unless great care is exercised. It would be well to go through the orchard first and mark the permanent trees with a piece of white rag, or something, and then go over and check up the work before actual cutting is begun.

To find the distance between trees after thinning multiply the original distance by 1.732.

To determine the space to set trees with a view to future thinning when the permanent distance is known, divide permanent distance by 1.732.



TRIANGULAR OR ALTERNATE SYSTEM OF PLANTING

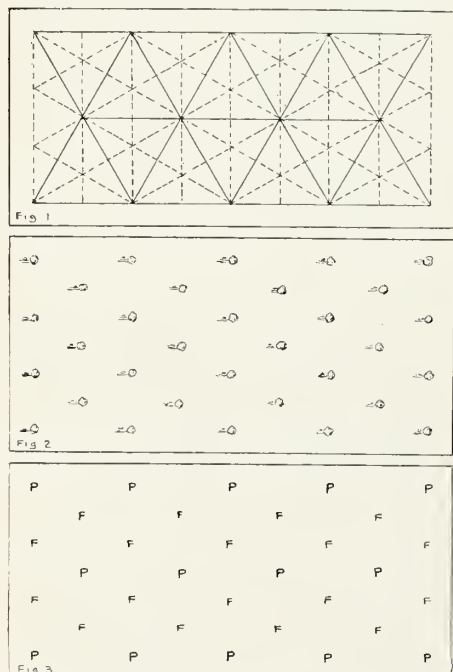


FIGURE 1—Field marked for hexagonal planting. Large triangles indicate which trees are permanent. FIGURE 2—Orchard planted. FIGURE 3—P indicates permanent trees; F indicates filler trees.

CLEARING LOGGED-OFF LAND WITH STUMP BURNER

BY W. H. LAWRENCE, EXPERIMENT STATION, PUYALLUP, WASHINGTON

A MORE rapid development of the agricultural lands in and near the timber area in Washington is desirable, since, in many cases, the demand for farm produce exceeds the supply. This condition can be overcome in case a more rapid and less expensive method in clearing logged-off land can be practiced. Generally the present methods as practiced have proven to be too slow and ineffective, or too expensive to be practiced by one of limited means. Cheaper and more serviceable methods are desired. Usually the more rapidly the method and the greater the results, the higher the cost per acre. Owing to so great a demand for money in other

industries which are paying good dividends on short investments, only a limited amount of capital has been available for use in clearing land or in making more rapid and effective the present methods. More recently, however, the clearing of logged-off land is receiving much more attention. Much time is being devoted to a more careful study of the older methods, with the hope of improving them. Also, time is being devoted to devising and trying newer methods.

The oldest method is the hand method. By the use of peavies, mattocks, shovels and axes, the dirt is removed from the roots, which are then cut off and piled

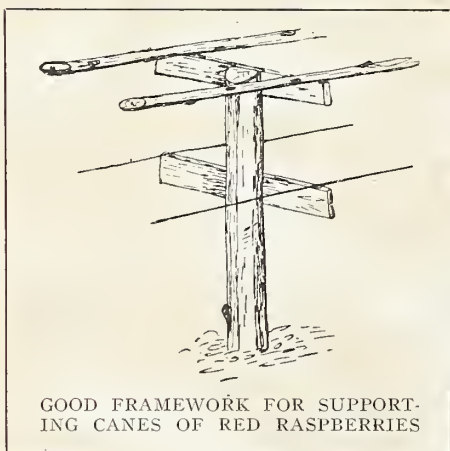
around the stump with the remainder of the debris and burned. An immense amount of slow and extremely taxing labor is required, but the land when cleared is in a better condition than when it is cleared by other methods. More recently capstans and stump-pullers have been used to a good advantage, in connection with the hand method. The work is made less laborious and more rapid, but the cost is usually somewhat greater. The work of removing stumps has also facilitated and made more effective, under a wide range of conditions, by the use of stumping powder. In removing stumps by this method, large holes are made in the ground



APPLE OR PEAR ORCHARD, SHOWING PEACH FILLERS. THE SQUARE PLAN

Apple trees 30 feet apart; peach trees in center, 19½ feet from apple or pear trees; 49 apple or pear trees, 36 peach trees; total number of trees per acre, 85. By H. B. Patterson, Medford, Oregon.

which must be filled before plowing can be done. The subsoil is scattered over the surface soil and the pieces of the stump must be gathered together and burned. The cost of the powder, the work of filling the hole, collecting, piling and burning the debris makes the method an expensive one. Boring intersecting holes into the base of the stumps and burning them (also practiced in burning down large trees) has also been a very serviceable method. While the destruction of logs by boring and burning has proven more successful, yet it requires as much time and hard labor, as does the practice of boring holes in stumps and burning them. In the case of the latter, however, very frequently the crown fails to burn, thus leaving the large roots intact. To complete the destruction by burning is oftentimes tedious and quite difficult work. In using stumping powder, which is the last resort in such a case, the explosion of powder usually breaks the weaker portions of the crown and fails to remove the roots. It is then necessary to place several smaller blasts in order to accomplish the desired results. In many cases it is necessary to separate the roots by hand in order to handle them to a good advantage. The charcoaling or pitting method is proving to be a very satisfactory and effective but slow method of destroying stumps. This method, like a majority of the others, does not provide for complete land clearing. All of the down trees and small timber that are not burned with the slashing must be destroyed. The use of stumping powder for splitting and loosening stumps preparatory to pulling and piling them with a donkey engine has proven to be the most rapid method. This method, as practiced by many, has proven to be a very expensive one. After the stumps have been pulled and piled with the logs and other debris collected and piled by the aid of the donkey engine, it is necessary to remove many roots which were broken off when the stumps were pulled, after which the large hole in the ground must be filled before the land is ready for the plow. While the method is a good one, it is expensive and requires considerable ready money. The use of the various types of stump-burning machines has been made with largely varying success, depending upon the condition of soil (variety of soil and water content)



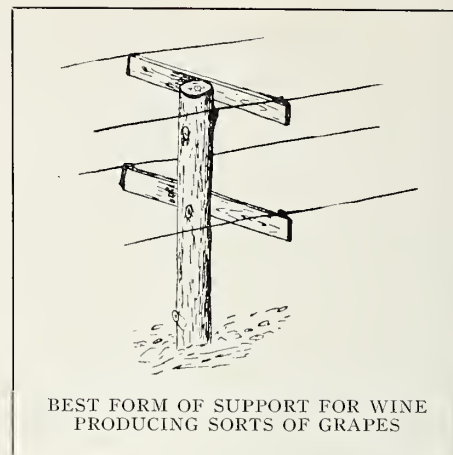
and the kind and condition of the timber. The above mentioned methods variously modified have been the most effective ones followed in land clearing.

While some methods have been more serviceable than others, none have yet met the requirements of the land owner of very limited means who possesses a few acres of logged-off land which was originally purchased for a home.

A machine, both inexpensive and serviceable, by which logs and stumps can be destroyed very rapidly and at a low cost, and with very little injury to the soil, easy to operate, requiring the attention of one or two persons, will to a large degree meet the requirements of the homemaker. With these requirements in mind, the stump-burner as described below was given a limited trial with sufficient results to warrant publishing the information gained in using the same.

The stump-burner consists of a one and one-half horsepower gasoline engine with a 13-inch flywheel and adjusted to run 650 revolutions per minute; a circular fan (No. IV. American blower with eight and one-half-inch fan and two and one-half-inch pulley) provided with a patent wind distributor tapped to attach five lines of one and one-half-inch hose; hose couplings; pieces of one and one-half-inch rubber hose of different lengths; a number of pieces of galvanized iron tubing; a few small iron plates, and several lengths of boiler tubing slightly curved at one end, which are used as blow-pipes. The hose couplings are used to attach the rubber hose to the wind distributor and the blow-pipes. The tubing, which is of the right diameter to fit inside of the hose tightly, is connected with short pieces of rubber hose eighteen to twenty-four inches in length. By using tubing and short pieces of hose of variable length the right size to telescope, provision is made for varying the length of line of hose as desired. The lines of hose are very light and easily adjusted, since no couplings are required. The tubing connected by short pieces of hose also prevents doubling, thus retarding or stopping the current of air. From the description, it is plainly seen that the stump-burner is small, light in weight and very cheaply constructed. At a later date the blower was coupled with a two-horsepower gasoline engine and mounted on a truck. With the latter engine a few trials in operating a wood-boring auger by power were made as described in another part of this article.

The machine was set in a convenient position to burn several stumps at a time. Auger holes, two inches in diameter, were made in the base of the stumps. The boring was done by hand. The auger was directed inward and downward in order to extend the hole as low and as far as the center, or even three-fourths to seven-eighths of the diameter when the stumps were of large size. Short pieces of hose with couplings on one end were attached to the wind distributor, and sections of galvanized iron tubing inserted, after which alternate sections of hose and tubing were added in order to make the lines of



hose of sufficient length, after adding the last section of hose with the blow-pipe attached, to reach the stumps. A fire was then started in each auger hole by using live coals of wood or kindling. The machine was set in motion in order to fan the fires. In burning, it was the plan to drive the fire to the center of the stump and to confine it as long a time as possible, preventing, if possible, the forming of a large opening at the point of entrance. This was accomplished by inserting the blow-pipe into the opening as fast as the burning would allow. Occasionally, burning around the blow-pipe takes place more rapidly than desired. In such a case it was found advantageous to use an iron plate of sufficient diameter to cover the hole. The plate has an opening in the center large enough for the insertion of the blow-pipe. By keeping the fire confined it is less difficult to drive it into the main roots than when allowed to burn in the open. The blow-pipes must be moved frequently in order to keep the fire burning briskly and to the best advantage. When the fire is confined and the air is constantly forced into the small space, the heat becomes so intense that the air burns as it leaves the blow-pipe, forming a long flame. The heat generated under such conditions is intense. Small rocks were readily melted when placed in the stumps which were burning briskly. The intense heat produces charcoal very rapidly. The layer of charcoal apparently retards the rate of burning. It is found advantageous under some conditions to frequently remove the layers of charcoal, using a long-handled iron chisel. After the center of the stump has been partially burned out and the opening is large enough to permit the introduction of kindling, it is an excellent plan to insert as much small wood as possible. The bed of coals formed by the kindling aids to maintain an intense heat. Excellent use of the debris can be made in burning the roots after the crown of the stump has been largely destroyed. From a very limited trial, it is evident that charcoaling and pitting the roots may be practiced to a good advantage at this stage with the stump-burner. Burning large logs is also quite readily accomplished. The best results were obtained by boring a hole as near the under side

of the log as possible and about three-fourths through it, after which the fire was controlled as described above. Small debris (sections of dead limbs, etc.) may be inserted into the log to a good advantage after the fire has made a cavity of some size. Again, as in burning stumps, it is advisable to remove the charcoal with the long-handled chisel.

After the logs have been burned into sections and reduced in weight so that they can be handled to a good advantage, the tops of the stumps (which are seldom entirely burned) may be piled with the other debris, consisting of all small stuff, together with the small trees which have been cut into sections for convenience in handling, and burned. It is advisable to use the outfit only in case marked results cannot be obtained in burning the pile.

Trials were made in burning both cedar and fir under various conditions. The first trials were made in a marsh, in burning cedar stumps and logs which were so saturated with water that it was impossible to burn them without the aid of a machine. The intense heat, generated by the burning air and wood (especially when the fire was confined), produced a heat which dried the wood faster than burning took place. This trial lasted for period of eight days. The results obtained under such conditions were encouraging. Better success, however, was met with in burning fir.

Stumps of various ages and conditions were burned. It is found that the greater the stump, the more quickly it could be destroyed. The condition of the older stumps was found to vary from solid to badly decomposed, by the action of the elements, assisted by saprophagous fungi and wood-boring ants. Stumps consisting of fir wood which have not absorbed very much water are easily burned. Naturally the more pitch they contained the more rapidly combustion took place. Those stumps, however, in various stages of decay and full of fungi, and in many cases well saturated with water, were usually more difficult of destruction. Concerning the various conditions of fir stumps, it can be said that the general appearance is no indication of the ease with which they may be burned. In several instances, stumps apparently sound, as indicated by external appearance, were so thoroughly saturated with water throughout the greater portion of the heart wood that, after the holes were bored, the water continued to drip or even in some cases to run from the wood for a period of several minutes and even hours. The intense heat which can be generated by the aid of such a machine is sufficient to destroy the most water-soaked and decayed forms, although the progress is much less rapid under such conditions.

One of the most important considerations connected with clearing the land is the burning of the soil. An examination of an area of land before the slashing is burned reveals considerable leaf mould and humus on the surface and in the surface soil. Following the fire, no humus is found on the surface and little

or none in the soil, since a very large proportion, if not the entire amount, has been destroyed during the burning. The burning of the slashing is necessary, and the injury done the soil cannot be controlled. In using the stump-burner it has been observed in this experiment that the soil is burned but very little. This is due to the fact that the blow-pipes can be placed so that the fire is directed to the best advantage. It has also been observed that in case the soil is dry, the volume injured is greater than where moisture is abundant. The water evidently prevents the heat from penetrating more than a few inches. It may also be said concerning this method of burning that the damaged soil is not left

The first test with the outfit was made in a marsh in burning cedar. Trials were made to destroy logs and stumps in all sorts of conditions—some solid, consisting of perfectly sound wood, while others were in various stages of decay, many times consisting of mere shells filled with rotten, water-soaked wood. A very large proportion of this material was thoroughly water-soaked. While very slow progress could be made in burning the partially dry logs, etc., by the usual method, nothing was accomplished in burning the stumps or piles of water-soaked logs, unless the machine was used. By the aid of the blower, however, burning was accomplished at a reasonable cost. The conclusion drawn was



TREES SET TOO CLOSE. NOT SUFFICIENT ROOM FOR CULTIVATION

on the surface, but, since it forms a part of the subsoil, is buried when the hole formed by the destruction of the stump has been filled. It is also true that the virgin soil which has been exposed to the elements for so long a time is not burned or mixed with the subsoil, as such is the case in leveling after clearing when stumping powder has been used in connection with various devices, such as teams and tackle, donkey engine and stump-puller. It is also to be noted that the volume of soil damaged by burning in this method of clearing is but a small area as compared with the diameter of the stump destroyed. It is the opinion of the writer that of the various methods of land clearing which injure the soil, this one does the least of any of the methods practiced.

Inquiry has been made concerning the fertilized value of ashes of wood which has been burned in this manner. The volume of ash is small. There is very little potash present, since the high temperature to which most of the ash has been exposed volatilizes the compound containing this essential plant food.

based upon the expense of operating the machine, as compared with the amount of work accomplished.

The second test was made in burning fir stumps which had been split by the use of stumping powder. It was easily demonstrated that splitting the stumps previous to burning with such a machine makes the work tedious and much more expensive. The fire is much more difficult to control, since it is impossible to produce a great enough heat to do as rapid burning as under conditions where burning is easily controlled.

During the third test a fir log cut in 1907, eighty-five feet long, with an average diameter of thirty-six inches, partially sound and partially infested with fungus, and which had split about one-third its length when cut down, was burned in ten hours' time—five lines of hose, nine hours, and one line, five hours. The log was burned in sections which were rolled together by the aid of a peavy, and the burning finished by the use of one line of hose.

Two green fir stumps, one five feet in diameter five feet above the ground,

twenty-two feet around the base at the ground, with twelve large roots, and the other four and a half feet in diameter six feet from the base and measuring a little under nineteen feet around the base, with eight roots, were burned off in a twelve hours' run. The twenty roots, with the exception of three very large ones, were burned below the level so that the plow would go over them. A run of four hours with four lines of hose was required to finish the work. The cost to do the work, basing the cost of labor at 30 cents per hour, and a charge of 70 cents for gasoline and oil, the average price for removing the stump would be \$2.60 each.

Twenty-two hours' work on a green fir stump about five feet in diameter, with large spreading roots, gave less encouraging results. The small fir burned out completely, even the smaller roots penetrating to a depth of three feet. The crown of the cedar burned, separating

the roots but not low enough for plow to pass over them. The roots of the large fir were water-soaked, hence burning was almost impossible. In both cases, the crowns were burned out, separating the roots. Basing cost on above mentioned price, the average cost was \$2.73.

The sixth test was made on cedar stumps, one two and a half feet, and one four feet in diameter, and a green fir five feet in diameter six feet from the base. It took twenty-eight hours to complete the work. The roots were not burned out. During this test a delay of several hours was caused by a disabled engine, thus making it impossible to control the fire to the best advantage. The cost per stump was \$2.93 in this trial.

A group of five old fir stumps, one two feet, two each three feet, and two each two feet and six inches in diameter, each nine feet high, more or less decayed and thoroughly soaked with water, were

burned, low enough to destroy the crows, thus separating the roots, in a twenty-two hour run. These stumps were in such a water-soaked condition that the fire would not burn after the blowers were removed. The roots could not be burned, owing to the abundance of water in the soil. The average cost for doing this work was \$1.56 each.

Another group of five fir stumps, nine feet tall, with an average diameter of three feet six inches, mostly sound but water-soaked, were burned, as low as the soil conditions would permit, in twenty-seven hours. Again the crowns were destroyed, leaving the roots separate. The average cost of this work was \$1.70 per stump.

Five large fir stumps, each ten feet in height, averaging five feet two and one-half inches three feet from the bases, were burned off so that all the crowns were destroyed, leaving the roots separate, many of which were also largely burned up. Forty hours' time was required to do the work. The cost of burning done on each of these stumps was \$2.80.

The economical destruction of large stumps is the most perplexing problem in land clearing. By the use of the stump-burner the crowns of stumps are readily destroyed, thus leaving the roots separated. The roots may be burned below the surface so they will not interfere in cultivation, or they may be removed by the use of small quantities of stumping powder or some other convenient method—the method to be determined by the cost. The stumps of the smaller growth may be removed at this time and by the same method. The large logs may be burned in sections, the smaller ones cut into convenient length for handling, and the entire mass of debris, including the small rubbish, collected in piles and burned. By this method, the important problem of putting the entire mass into a condition so that it may be handled and burned quite readily is accomplished, leaving the land ready for the plow.

To operate the outfit described for a period of ten hours requires the services of one man, two gallons of gasoline and a small quantity of cylinder oil. The cost for labor, at \$2 per day, and two gallons of gasoline and a small quantity of cylinder oil would make the cost of operating exceed \$2.50 per day. In operating a five-line burner, the operator has time to get together the small refuse, and to saw into convenient lengths for handling the timber which is too small to burn to a good advantage with the aid of the machine. It is believed from the experience gained in the use of this stump-burner that one large enough and equipped to operate ten lines of hose at a time could be operated to a better advantage. The increase in cost of operation of a large machine would only exceed the original cost of operation of the five-line type by a small per cent. The large machine would require more gasoline and cylinder oil.

The average cost of burning stumps was \$2.30. These stumps averaged forty-seven inches in diameter. To remove

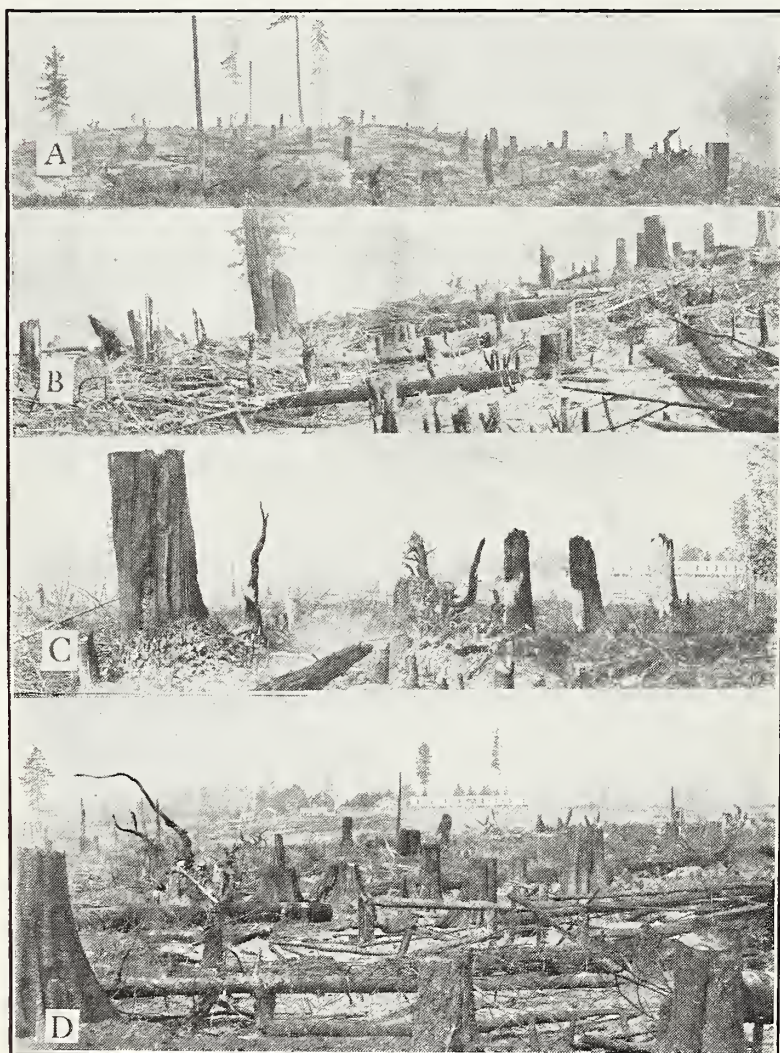


PLATE I—FIGURE A—General view of a tract of land once heavily timbered, but from which the logs were removed during the early days of logging. The secondary growth on the tract has since been cut down and has just been burned over. FIGURE B—View of the same tract, showing the stumps of second-growth timber and the material which did not burn during the period of burning. FIGURE C—View of several large stumps in various stages of decay, as shown by the irregular and much splintered tops. These stumps were thoroughly water-soaked, but were burned as low as soil conditions would permit, at an average cost of \$1.70 per stump. FIGURE D—General view of a small area once heavily timbered with cedar.

such a stump by blasting would require about thirty-three sticks (twenty-five pounds) of powder at thirteen cents per pound. The powder would cost \$3.25. Considering the additional cost of doing the blasting, filling the hole caused by the explosion and the work required to destroy the stump after it has been removed by the use of powder, the practice of burning can readily be seen to be by far the cheaper one. It is also to be noted that the purchase of the powder requires \$3.25 ready money. In using a stump-burner, the cost is represented very largely by labor at \$2 per day.

Clearing land with a stump-burner requires good management in order to obtain good results. It is essential to place the blow-pipes in the right position in order to direct the burning to the best advantage and the right distance from the fire to insure rapid burning. The operator must be a good observer, industrious, and a steady worker to get the desired results.



GOOD METHOD FOR DESTROYING STUMPS AND LOGS.

By W. H. Lawrence, Western Washington Experiment Station, Puyallup, Washington.

AS concluded in the first part of this article, a stump-burner to be had at a reasonable cost, light in weight, and easy to handle, easily and cheaply operated, with which effective and rapid destruction of logs and stumps is accomplished, more nearly meets the requirements of the small land owner of limited means.

While the plan followed, to confine the fire and direct the current of air so that the greater portion of the interior of the log or stump has been consumed before the fire breaks out, has proven to be a successful and cheap method, a more rapid burning is desirable. It is also true that a stump or log, when properly bored so that the holes extend about three-fourths through the obstacle of destruction and they intersect, merging at a wide angle and are so slanted that a good draft is possible when a fire is started at the point of intersection, will in many cases be partially consumed, a log will usually burn into sections and the greater portion of the crown of a stump will be destroyed, yet leaving the large roots still united.

A judicious combining of these two methods appeared plausible. It was very evident from experience and observation with both methods that the slow and tedious work of boring the holes by hand is responsible for a large portion of the time consumed. It was also evident that in some cases at least much more effective and rapid work could be done by increasing the number of holes, in order to place the fires in different portions of the same piece of wood at the same time.

In order to accomplish the boring of a large number of holes, and at a rapid rate, some form of mechanical power must be employed. The engine, mounted on the truck with the blower (also mentioned in the preceding article and shown in Plate I, Figures 1 and 2) was



PLATE II—FIGURE A—View of stump burner outfit mounted on a truck, showing the machine with lines of hose attached. FIGURE B—Closer view of the machine, as shown in Figure A. FIGURE C—The same burning outfit, as seen when mounted on skids. FIGURE D—Picture of stump burner shown in Figure C which gives a better view of the machine, particularly of the wind distributor and the attachment of the five lines of hose used to convey the air to the place of burning.

fitted with a sheave wheel. A flexible shaft about seven feet in length, provided with attachments to be driven by an endless rope, was fitted with a 1½-inch ship auger with a special shank about eighteen inches in length. The flexible shaft was then fastened to the stump or log to be bored by using a chain. It was then set in motion by the endless rope, guided by pulleys attached by leads to the nearest and most convenient obstacle, running on the sheave wheel of the engine. Running at a rate which did not make the task of holding the auger a difficult one, holes fifteen to eighteen inches in depth were easily bored in twenty to twenty-eight seconds. The average was twenty-five seconds. Using the same auger, and running it at the same speed, holes were bored to a depth of thirty to thirty-two inches in fifty seconds to one minute in time. The

average time was fifty-five seconds. The more rapid rate at which holes were bored to a depth of from fifteen to eighteen inches was due to the structure of the auger. The speed of the auger was sufficient to run shavings clear of the hole until it was inserted past the worm. Occasionally pitch seams or small knots cause the worm to clog. After insertion past the worm, however, the shavings would accumulate in the hole at the top of the shank and at frequent intervals were removed by withdrawing the auger, causing the worm to force the shavings out.

In order to remove the shavings while boring at this rate, it is apparently necessary to equip the auger with a much longer worm. In the limited number of trials made, it was somewhat surprising to note that such rapid work could be done with very little delay on account

of heating the auger. Care must be exercised at all times, however, so that the auger will not be heated enough to injure the temper.

To combine the method of burning by keeping the fire enclosed and briskly burning by use of the blower, and where the fire is given a natural draft as in the plan where intersecting holes are bored, a large fir log about three and a half feet in diameter was bored at four intervals about six feet apart. The plan in boring was to make one hole straight into the lower side of the log about four inches from lower edge and three-fourths the distance through it. Three to five holes were then made by directing the auger downward from the upper surface, connecting with the cross hole if possible.

The fires were started in the lower holes, the blower set in motion and the results noted. The fire, constantly fanned in the lower holes, advanced into the vertical ones very rapidly. In some cases all the vertical holes had not been made to connect with the horizontal ones. In these cases the rate of burning at first was greatly retarded until the fire ate its way through the solid portions of wood, connecting the vents. The fire, when fanned by the blower, is driven into all the openings, and very shortly every portion is lined with fire, which is also driven in short columns several inches in length from the mouths of the openings. In the twilight, the several short and straight but even columns of fire, appearing like so many fiery spines growing from the log, each merging into a small column of smoke of various shades and colors, the several rings located at various intervals on the log, the glare and low constant roar of the fire, the hum of the fan, the explosion of the engine and the deepening of the evening shades as twilight merges into dusk, makes the scene of burning a weird and picturesque one.

Although several minor trials were made with good results, the main experiment was conducted on a large log. Each set of boring gave slightly different results. In one case the lower hole was bored entirely through the tree. It was impossible to burn to advantage, since a draft could not be produced in the longer and vertical holes. In another trial, the holes were not bored as deeply as the cross holes. It took some time to get the fire burning briskly and to connect all these vents with the lower one, since several inches of solid wood had to be consumed before a draft was possible. On trial, however, where the cross holes met with the vertical vents, in every case, the fire started in the lower hole, advanced into all upper ones very rapidly, and continued to burn briskly. In less than one hour the entire center of the log had been burned out, leaving a shell about six to eight inches in thickness. By making vents to direct the fire, burning can be easily controlled and made more effective by placing pieces of bark or sods of dirt over one or any number of the vents, thus stopping the drafts, and making a few new vents, if necessary.

The trials were very limited in developing this method, since they were

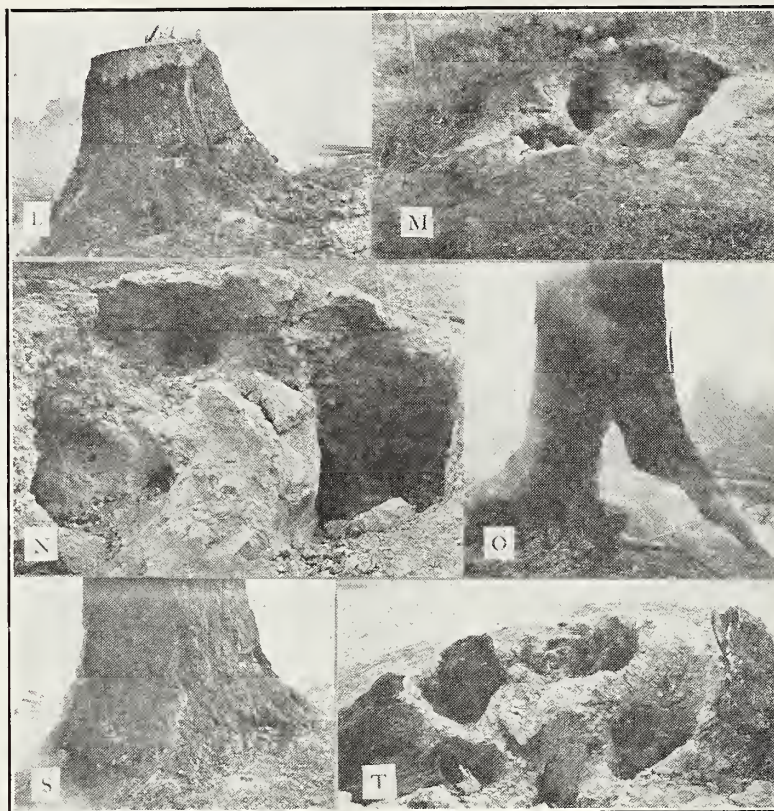


PLATE III—FIGURE L—Green fir stump five feet in diameter at the top and measuring twenty-two feet around the base at the ground, with twelve large roots. This stump was burned out at a cost of \$2.60. The roots, with the exception of three very large ones, were burned below the level, so that the plow would pass over them. FIGURE M—Showing hole in the ground left when a small fir tree was burned by the aid of the stump burner. The entire tree was burned out, even the smaller roots, to a depth of three feet. FIGURE N—View of the hole left in the ground after the stump shown in Figure L was destroyed. FIGURE O—Showing the way in which the base of the stump is burned out in using the stump burner. A blowpipe is placed so that the fire is driven into the roots, thus burning the crown of the stump and the greater portion of the roots near the surface of the soil. FIGURE S—The stump shown in this picture was four and one-half feet in diameter six feet from the base, at which place it measured a little less than nineteen feet in circumference. There were eight large roots. The crown of the stump was burned out in a twelve-hour run. The cost of burning this stump was \$2.60. FIGURE T—Showing holes left in the ground after the large stump shown in Figure S had been destroyed, with the exception of three large roots, which spread out over the surface of the ground for a distance of several feet. This figure well illustrates the value of such a machine as used in the experiments in destroying the crown of a stump. Destroying the stump in this manner eliminates the problem of handling enormous weights of wood. The roots are all separated, thus making it easy to remove them by the most expedient and less expensive method for doing such work. It is sometimes advantageous to bore holes into the large roots and burn them below the plow line. In other cases it is advisable to remove them in some other manner.

necessarily discontinued by a disabled engine and followed by heavy rains interfering, and furthermore requiring the attention of the entire station force to care for grain and other crops.

Owing to a slight unavoidable change in the plan of the work, the writer finds it impossible to continue the work on this method at the present time. Believing that the results obtained are worthy of further consideration, the plan of work and conclusions drawn, together with the method pursued, is herewith given.

In conclusion it may be said that this method is a very promising one, since—

1. The machine used is easy to handle and serviceable.
2. Much time is gained by boring the holes by power and makes it possible to bore large numbers of holes in a very short period of time.
3. Directing the flame by making vents insures burning in the desired direction. By the use of these vents, fire may not only be driven in the desired

direction, but the rate of burning may be regulated. The rate of burning may be easily regulated by placing pieces of bark or sod over the vents or by inserting the section of the limb of a tree—using and conclusions drawn, together with the least exertion.

4. Wood burns more rapidly when given a draft than where the fire is confined. The rate of burning may be regulated by the amount of air forced through the vents by the use of a blower.

5. Considerable effective burning may be accomplished by boring a series of holes for vents, after which the fires may be started and allowed to burn by the natural drafts—burning trees into sections and the tops of large stumps, etc.

6. Combining the methods of burning stumps and logs by the use of a stump-burner and boring intersecting holes and burning, so that the fire is guided to the best advantage and caused to burn briskly by a continual forced draft is both practicable and advisable.

INFORMATION FOR THE PROSPECTIVE ORCHARDIST

BY W. S. THORNER, HORTICULTURIST, WASHINGTON EXPERIMENT STATION, PULLMAN

THE purpose of this article is to act as a general guide for the many prospective apple orchard planters who have recently come to our state from the east or have changed their vocation and now need definite advice upon apple orchard work. The information is not complete but the essential factors are well worth the careful perusal of even many of our pioneer planters.

Location and Soils—Land that is slightly higher than the surrounding country is best for, orchard purposes, since it affords better air drainage, thus lessening the danger of late spring frosts and usually provides good soil drainage. A south or southern slope is better for early or highly colored fruits, while a north or northeast slope is best for late or winter fruits.

Practically all kinds of land in the state are being used for orchard purposes; and while the apple is very cosmopolitan in its choice yet the deep, rich, loamy or basaltic soils, free from alkali, hardpan, or substratum of shale rock are producing the best and most productive trees. Very sandy, light, dry or even rocky soils produce short-lived, unproductive trees, while heavy wet clay soils produce large, tardy-bearing trees.

The greater part of the soils of the semi-arid districts of Washington while rich in mineral plant foods are frequently deficient in nitrogen and humus. These deficiencies should be arranged for, if not provided before planting the trees by means of cover crops, green manure or commercial fertilizers.

A good orchard soil possesses at least three strong characteristics; good water drainage; good texture and plenty of available plant food.

Preparation of the Soil—Before starting to plant, the soil should be deeply plowed, thoroughly subdued and in perfect tillage, as it is very expensive to prepare land or subdue it after it is planted to trees. If the orchard is to be irrigated it is an excellent plan to run the water over the land after the grading and leveling is done to determine if it will irrigate as it is intended.

While many orchards are being planted on raw sage brush land and a few on land that is not even cleared yet, it is the experience of the majority of our best fruit men that in the long run it pays to till or even crop the land for one or two years or at least plow under a green crop of rye or Canada peas before planting the trees.

When it is necessary to plant trees on poorly prepared land a small amount of nitrate of soda or dried blood and bone meal mixed with the soil as the trees are being planted adds very materially to their growth during the first year after planting.

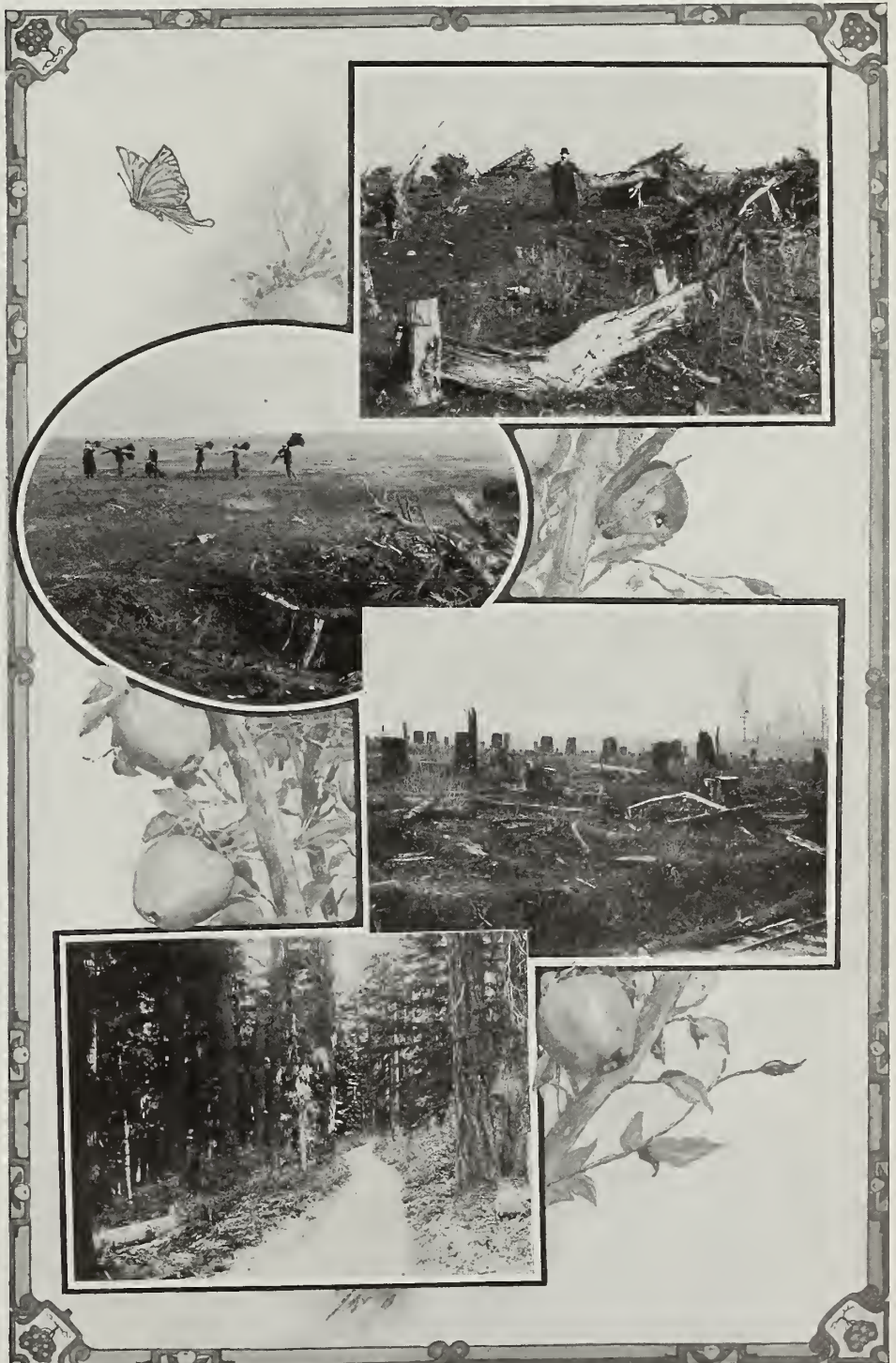
Nursery Stock—Only one year old, well-grown but not over-grown trees should be planted. Older trees increase the cost of transportation and planting and are usually headed too high for the best results.

A medium sized, not too small a tree, has many advantages over the large or over-grown tree. One of its chief advantages is in having active buds on the lower part of the stem from where we desire our branches to spring.

The difficulty of getting trees true to name has caused many planters to consider the advisability of growing their own trees. Where the person has the necessary knowledge, time, and land he can usually grow trees cheaper than he can buy them; however this is a business

of its own and requires more skill, time, and patience than the average grower can give to it. Consequently it is generally cheaper to buy exactly what is wanted than it is to grow it.

Other things being equal, it is best to buy from the nearest nursery as the stock is usually acclimated and better adapted to the location than stock grown under different conditions. Buy only the very best; second class stock and culls are dear at any price and should never be used in commercial orchards. A



THE PICTURE IN THE LOWER LEFT-HAND CORNER SHOWS GROUND BEFORE BEING CLEARED. THE OTHER PICTURES SHOW THE VARIOUS STAGES OF THE PROCESS OF CLEARING. THE OVAL SHOWS A PARTY PLANTING THE TREES

diseased, stunted or injured tree rarely if ever develops into a first-class tree.

It matters little whether a tree has been propagated by budding or by root-grafting so that it is a healthy, well-grown tree. Usually a budded tree is taller than a grafted tree but one is as good as the other if the individual is well grown.

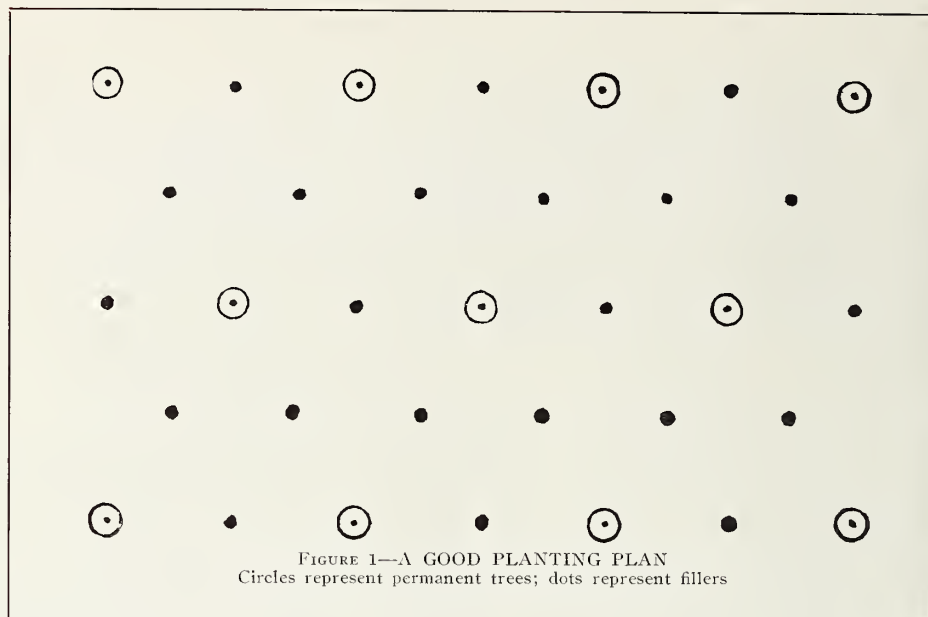
Distances Apart to Set the Trees—The soil, the variety and the section of the state all materially aid in determining the distance at which apple trees are to be planted. In Western Washington on rich deep soil where there is abundance of rain large growing trees like the Northern Spy require at least thirty-five feet and should have forty feet.

In Eastern Washington in sections where the trees do not grow so large but the question of moisture is paramount the trees should be set from twenty-eight feet without fillers to thirty-three feet with fillers. While in irrigated sections where the moisture element is under the control of the grower they may be planted at from twenty-five feet without fillers to thirty-three feet with fillers.

Planting Plans—There are many planting plans in use in the state at the present time; the square and hexagonal plans are more commonly used than all the rest together. Each of these plans has advantages that the other has not and should be adapted to their special use. The chief advantages of the square plan are that when planting trees at the same distances apart as in the hexagonal plan there is more room between the rows for the growing of cultivated crops, and after the trees are grown up they do not form a canopy over the soil so early as when planted by the latter plan. Some growers contend that these openings or "wells" formed by the crowns give healthier trees and more and better colored fruit than where these do not exist in the orchard.

The hexagonal plan gives the greatest number of trees per acre and equally divides the soil area and air space among the trees. In our opinion it is by far the most satisfactory planting plan to use for apple orchards.

Locating the Positions of the Trees—After thoroughly preparing the ground and all is ready for planting it is best to locate and stake the positions for the trees. This may be done in a number of different ways; however for the inexperienced planter one of the following plans may be best. For laying out the square and alternate plans secure a No. 10 gauge galvanized wire long enough to reach the entire length of the field; have a tinner solder small washers on to this wire at exactly the same distances apart that the trees are to stand in the rows. Some planters tie pieces of rags or wrap with fine wire and succeed fairly



well but there is too much danger of these markers slipping. Establish a base line to work from and stretch the wire where the first row is to be planted. Set a stake fifteen to eighteen inches long opposite each washer or marker and move the wire to the next row, being sure to always stretch it the same each time, thus continuing over the entire field. If the square plan is used this is simple enough; but if the alternate plan is used have twice as many washers soldered to the wire and set stakes at alternate marks for each row, thus avoiding pulling the wire back and forth.

In staking for the hexagonal plan take three two to two and one-half inch iron rings and two pieces of light wire, securely fasten one end of each wire to one of the rings and the other rings one to each of the free ends of the wires. When stretched out these rings must measure from center to center exactly the same length that the trees are to stand apart. After the exact position of the first row is determined, and each tree in the row is located by a stake, then by means of the above described device a man and two boys can readily locate the rest of the trees by slipping a ring of one wire over the first stake in the row and the other ring over the second stake, then by pulling the two wires taut by the third ring the first tree of the second row is located, and by changing the rings to the second and third stakes of the first row the second tree of the second row is located, and so forth until the entire field is staked.

A stake about one inch square and fifteen inches long will be found very convenient as a marker for locating trees and if six inches of the upper end be dipped in common whitewash it will

make it easier to see in case there is any aligning to be done.

Digging the Holes—Before digging the holes locate two position stakes for each tree stake by means of a planting board. This is a 1x4-inch board, six feet long, with a deep notch in the center and a shallow notch in each end. By placing the middle notch against the tree stake and driving a stake in each notch at the ends of the planting board the tree stake can be removed and the hole dug. Then by placing the board in position again the center notch of the board shows the exact location for the trees. The tree can be planted and the board removed and the tree will align with the rows as the stake did before it was disturbed.

The size and depth of the holes depends entirely upon the size of the roots of the trees. A hole less than eighteen inches in diameter makes it difficult to tramp the soil as firmly as it should be tramped.

Fillers—Whether or not it is advisable to use fillers in an orchard depends entirely upon the ability of the planter to remove them before they do serious if not permanent injury to the trees. Fillers never do any damage in an orchard until they begin to contend with the permanent trees for food, moisture, sunlight or space. This being true it is possible to grow fillers in an orchard for several years and do no injury, and at the same time harvest good crops of fruit that will help maintain the necessary expenses. Many growers have been able to pay for their land and all expenses of caring for the orchard by means of the fruit from the fillers before the permanent trees came into full bearing.

Any early bearing good commercial variety of apples would make an excellent filler for the orchard. Almost any variety can be used as a filler; however, it would be of no advantage to use a tardy or shy bearer as a filler. The varieties that are most commonly used are the Wagener, Winesap (common), Wealthy and Missouri Pippin. But since the Wealthy is an early variety in most

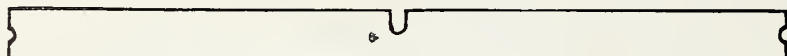


FIGURE 2—PLANTING BOARD



GRAND VALLEY, COLORADO, PEAR ORCHARD, ON DENVER & RIO GRANDE RAILROAD

sections of the state and not considered a first-class fruit, it is best not to use it. The Missouri Pippin, while a good bearer and good shipper, lacks quality, hence ability to sell well. This leaves only the Wagener and Winesap as first-class commercial apples that are well adapted to use as fillers.

Pears either on dwarf roots or as standards make good fillers for apple orchards, in most parts of the state.

In sections where the peach is a commercial success it makes an excellent filler and can be used advantageously in this way. The cherry should never be used as a filler for the apple orchard since it requires entirely different methods of cultivation and irrigation.

When to Plant—If the soil is moist enough and yet well drained, and well ripened nursery stock can be secured before cold weather sets in, fall planting is probably the best, but since our trees frequently continue to grow in the nursery until late in November it is almost impossible to get naturally ripened stock in time for fall planting. For this reason early spring planting is preferable. Secure the trees in the fall and carefully heal them in near to where they are to be planted so that during the first warm days of spring they can be properly planted.

Treatment of the Trees Before Planting—Just as soon as the trees are received from the nursery they should be well healed in; in moist soil, even though they are to be planted within a few days. Do not stand the trees up in the original bunches and throw some loose earth against them but cut the bunches open, spread the trees thinly in trenches extending east and west that are deep enough and wide enough to hold the roots, and lean the tops toward the south at an angle of about forty-five degrees. Thoroughly cover the roots, and from sixteen to twenty inches of the stems, tramp the earth firmly around the roots and the trees will not suffer. In healing in large quantities use a series of short trenches, using the earth from

one to cover the trees of the preceding row and let the tops overlap, all leaning in the same direction.

When ready to plant take the trees as needed from the pit, and never permit the roots to become dry, and just before they are to be planted thoroughly prune the roots. All the ragged or bruised ends should be cut off with a sharp knife, making the cut in such manner that the cut surface will rest on the bottom of the hole. Small fibrous roots that may have become dry should be cut away as they will never be of further service to the tree. Trees with diseased roots should not be planted but relegated to the brush heap and burned.

Planting—The hole must be deep enough to permit the setting of the tree from one to two inches deeper than it grew in the nursery in order to allow for the settling of the soil and yet have the trees the same depth as they stood in the nursery. The roots should not be bent or crowded but allowed plenty of room.

After placing the roots firmly on the bottom of the hole fill in with good rich loose soil until all the roots are well covered and then tramp the soil just as firmly as possible. The dryer the soil the more firmly it should be packed. Trees should not be planted in very wet, sticky soil. Fill in with the remainder of the soil until the hole is almost full and then tramp again; finally fill in the rest and leave the surface loose. In irrigated sections where water is handy the firming may be done by running water into the hole after half to two-thirds of the soil has been loosely shoveled in.

Varieties—The following list is made up from a large number of recommendations by growers in all parts of the state, based upon the general behavior of the variety in that particular section and its color, quality and value for commercial purposes:

Western Washington—(Winter) Northern Spy, Glowing Cool, Ortle, Olympia, Yellow Bellflower,

Yellow Newtown, Rhode Island Greening, (Autumn) King, Gravenstein, (Summer) Yellow Transparent, Red June.

Inland Irrigated Valleys—(Winter) Winesap, Yellow Newtown, Jonathan, Spitzenberg, Rome Beauty, White Winter Pearmain, Delicious, Winter Banana, (Autumn) Gravenstein, King, (Summer) Yellow Transparent, Duchess, Williams Favorite.

Inland Uplands—(Winter) Wagener, Rome Beauty, Jonathan, Gano, White Winter Pearmain, York Imperial, (Autumn) King, Duchess, Gravenstein, (Summer) Yellow Transparent, Williams Favorite.

There are many other varieties that can be grown in all parts of the state, some of them equal to or even better quality than those named, but they are as yet unknown to the market and so are not safe to plant commercially.

ON page 42 will be found an article giving the varieties of fruit suitable for planting under conditions existing in different districts, which will be of benefit to anyone desiring such information.



STUDENTS OF THE WENATCHEE, WASHINGTON, PUBLIC SCHOOL AT WORK GRAFTING

PRUNING FRUIT TREES A VERY IMPORTANT FACTOR

BY PROFESSOR W. S. THORNBUR, HORTICULTURIST WASHINGTON AGRICULTURAL EXPERIMENT STATION

PRUNING is one of the most important factors in the production of first-class fruit. There are many methods of pruning, and while they all aim at the same purpose, many mistakes are made each year. The most important rule that can be followed is to prune regularly and lightly. Each tree is a problem in itself and must be dealt with accordingly. The aim must be to make the best of each tree.

It is impossible to transplant a tree without losing from one-half to two-thirds of its feeding roots, hence at this time, if at no other, the tree should receive a severe top pruning. Such pruning is very valuable, since it lessens the amount of transpiration, prevents wind injury and helps in establishing an equilibrium between the top and root.

Reasons for Pruning—Because most trees produce more buds than they can possibly develop into limbs; to develop a strong framework and stocky stem; to compel laggards to grow more rapidly; to keep vigorous growers under control; to correct the evil habits of a variety; to remove diseased, broken and undesirable limbs.

There is no best time to prune all varieties of fruit in all climates. The vigorous growers and light producers should be summer pruned, while slow growers and heavy bearers will usually do best when winter pruned. Winter pruning tends to produce abundant wood growth, which is very desirable in young trees, but not altogether desirable in old or bearing trees. Heavy top pruning during the winter season is usually followed by a heavy crop of water sprouts. Summer pruning tends to produce fruit or flower buds, as does any check of growth. Summer top pruning of bearing trees does not often result in heavy growths of water sprouts.

The heavy growth and tardy fruiting habits of the trees of Western Washington makes summer pruning almost a necessity; while the rather light growth and early fruiting habits of Eastern

Washington favor the winter pruning. Young trees of all kinds should be headed at the desired height when they are one year old. This is exceedingly important, and should never be overlooked. Low heading of trees economizes in spraying, thinning, picking, lessens the windfalls, and frequently improves the quality of the fruit.

In cutting back, make the cut about one-sixteenth of an inch above the first bud that is intended to grow, as in Figure 1. If cut closer than this the bud is apt to dry out, and if cut longer an undesirable stub will result. When pruning trees that have a compact habit of growth, cut to strong outer buds, in order to spread the top; in weak and

inches from the main stem and then cutting back to the desired place. Nothing can be applied to hasten the healing of these wounds. The ordinary tree is capable of healing all such cuts an inch or less in diameter within a reasonable length of time, but cuts larger than this should be coated to prevent the entrance of fungi and bacteria, which is best accomplished by applying a thick coat of lead paint. Grafting waxes crack and peel off before the wound is healed, while tar injures the bark and prevents healing.

APPLES

First Year—Prune the one-year-old tree to a straight whip, and cut the top off just above a bud which is eighteen to twenty-four inches from the ground. The spreading varieties, like Jonathan, Northern Spy, etc., should be cut off a little lower than the upright growing varieties, like Wagener, Rome Beauty, etc. If the lower buds start to grow, rub them off early in July, otherwise the tree will need no further pruning until the next spring. Slender stems may be thickened by permitting the lower buds to grow until August.

Second Year—Select from three to five of the best placed limbs; cut off the others close to the stem and prune the selected ones back to from one-third to one-half of their original length, leaving the most central one as a leader, which should be pruned from four to six inches longer than the others. This will leave a properly shaped frame upon which the crown is to be grown; see Figure 4.

Third Year—Select from two to three limbs for each branch of the frame; then remove the superfluous, broken or crossed limbs, and cut the selected ones back to one-half or one-third of their length. The leader should still be maintained, and the top carefully formed in order to prevent heavy growth in undesirable places; see Figure 5.

Fourth and Following Years—Remove all crossing, diseased or superfluous limbs, allowing two or three for each branch that was left the preceding year. Thin the center as much as possible in order to permit the sun and air to enter. In case of very long growths head in a little, but avoid heading back as much as possible from now on. Summer pruning may be employed to advantage after the fourth pruning.

PEARS AND SWEET CHERRIES

While these fruits are different, the same methods of pruning may be applied to each.

First Year—By nature these are upright growers; they should be headed back to from two to three feet when one year old. If necessary, rub off lower buds and shoots in July.

Second Year—Prune exactly as described for apples.

Third and Fourth Years—Thin where the growth is dense, remove diseased or broken limbs and cut the new growth back from one-third to one-half its length. Keep the trees well shaped and balanced, but do not shear the tops.

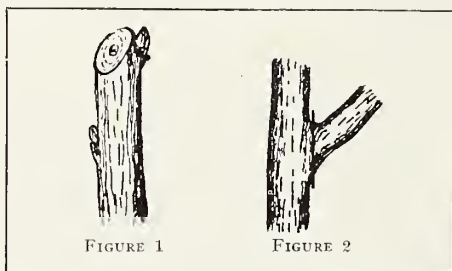


FIGURE 1

FIGURE 2

spreading trees, prune to inner buds to throw the limbs toward the center. Since wood growth is very desirable in young trees, they should be severely pruned each winter until they reach bearing age and size.

In Removing Limbs—Make the cut close to and parallel with the main stem, as shown in Figure 2. This frequently makes a larger wound than it would if cut at right angles to the limb, but it will heal over rapidly and leave the tree in better shape. Never leave stubs on the tree to die, dry up and form entrances for bacteria and fungi. If the limb to be removed is very large, care should be exercised to prevent its weight from splitting the main stem or peeling the bark when it comes down. This may be prevented by using a light rope to support it, or first cutting it off six to twelve

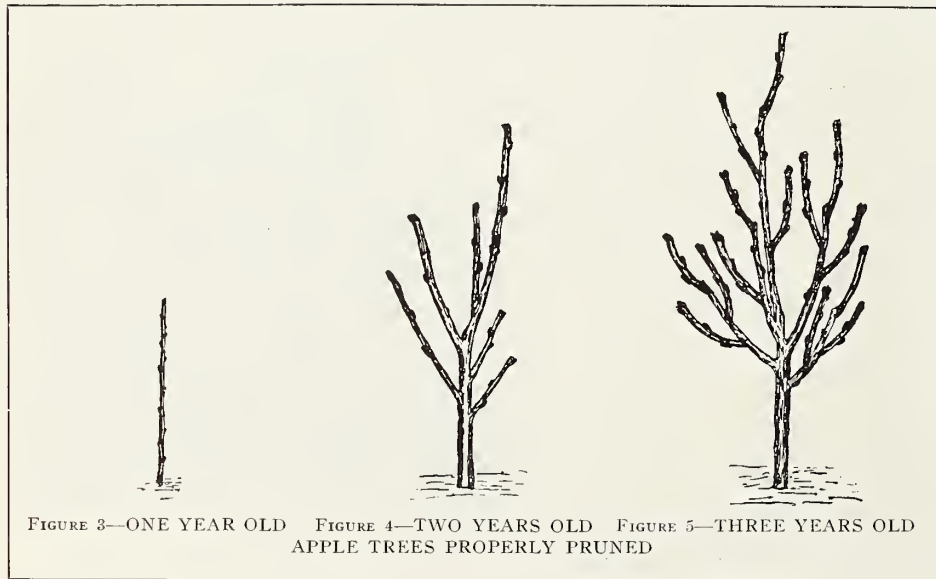


FIGURE 3—ONE YEAR OLD FIGURE 4—TWO YEARS OLD FIGURE 5—THREE YEARS OLD
APPLE TREES PROPERLY PRUNED

Strong trees will begin to produce fruit buds the third year. This will tend to retard growth and simplify pruning in the future.

Fifth and Following Years—Do as little pruning as possible from this time on, simply removing diseased, broken or interfering branches, since heavy pruning after this time tends to produce gumosis in cherry trees, and heavy growth in the pear which makes it more susceptible to the blight.

PEACHES

It is often said that a peach tree is never too old to prune. It will probably stand more cutting back and more "lopping" than any other fruit tree.

First Year—A one-year-old tree should either be pruned to a smooth whip and the top cut off at from twelve to fifteen inches from the ground, or the laterals may be "spurred," that is, cut off at from one to two buds long and the top cut back as before. Either method will give good results if the trees are in first-class condition. Remove the shoots from the lower part of the stem in July and induce as large a growth as possible.

Second Year—Select from three to five of the best limbs, remove the remain-

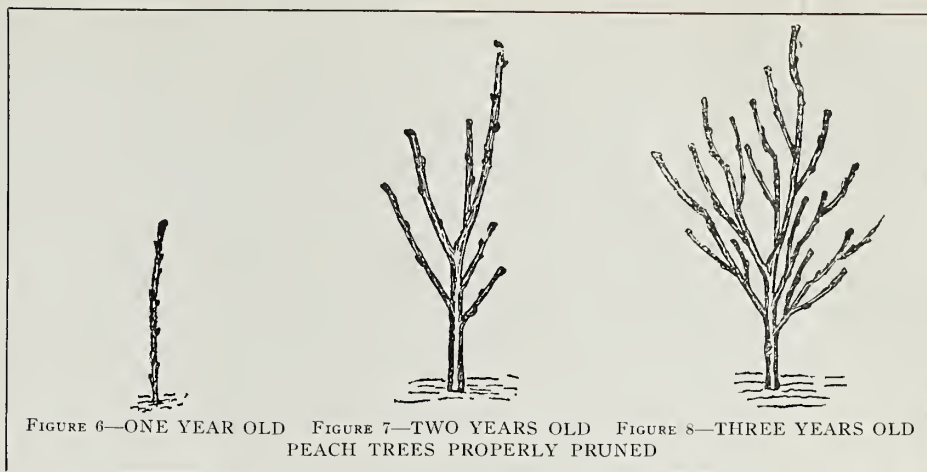


FIGURE 6—ONE YEAR OLD FIGURE 7—TWO YEARS OLD FIGURE 8—THREE YEARS OLD
PEACH TREES PROPERLY PRUNED

der and cut these back from one-half to one-third. A leader is not necessary in the peach, although it may be used, as shown in Figure 7. It is usually best to remove all laterals from the frame and secure as strong a growth as possible.

Third and Following Years—Remove superfluous, broken, diseased and interfering limbs. Cut the remaining ones back from one-half to one-third of their

length. Remember that the fruit of the peach is always grown on last year's wood, and that pruning and thinning of the fruit are closely allied in the peach.

Finally, it should always be borne in mind that pruning is largely a matter of common sense, and that a young tree is as plastic in the hands of a pruner as is a chunk of clay in the hands of a molder.

A GROWER'S OPINION OF PROPER TREE PLANTING

BY W. N. HUTT, STATE HORTICULTURIST, RALEIGH, NORTH CAROLINA

IT IS not every man who can properly plant a tree. That this is true is evidenced by orchard and shade trees all over the country. One can scarcely take an hour's drive in any farming community without seeing trees that are suffering from improper handling at planting time. From my observations, I think it safe to say that fifty per cent of the trees sent out from nurseries never come to usefulness. This great loss is due to careless and unintelligent handling rather than to any other cause.

Delicate Structure of Trees—In the first place, trees are not the nondestructible organisms one would be led to think they were, from the way one so often sees them handle. On the contrary, trees are made up of delicate organs, which are very subject to adverse conditions, and, like other other living forms, readily show the result of favorable or harmful environments.

The part of a tree above ground, because it is always subject to changing conditions of weather, has acquired the power of accommodating itself to a considerable range of conditions. Hardy trees can resist and accommodate themselves

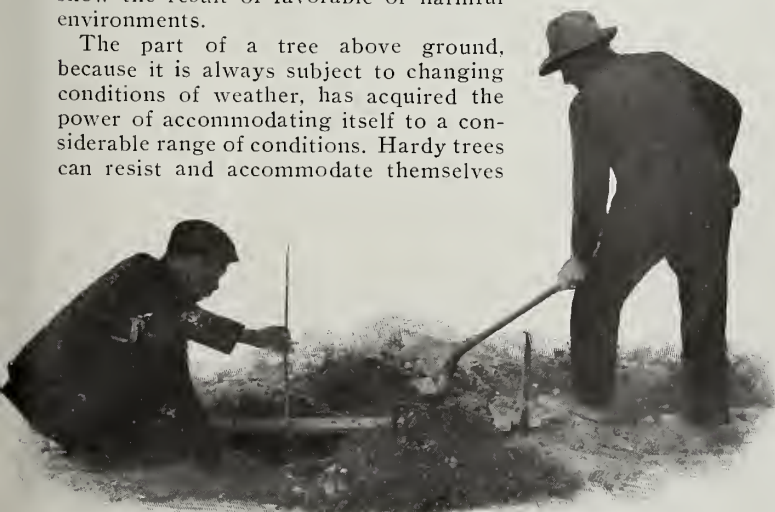
to a very wide range of temperatures. The root environment of a tree is of a very different nature from the conditions above ground. The more dense nature of the soil covering about the roots of trees makes them less susceptible to sudden changes than the air-exposed parts. For this reason the roots are much more tender and easily injured than the branches of a tree. Branches cannot endure root environment, nor can roots endure branch environment—and yet we often see trees exposed at planting time, as if the roots would stand whatever the tops would.

Root Hairs—In addition to these conditions of environment, roots have delicate organs, known as root hairs, that maintain their life only under conditions of moisture. These root hairs, as their name implies, are fine and hair-like—so fine, indeed, that one needs a microscope to see them perfectly. They have exceedingly thin and delicate cell walls and contain the active protoplasm on which the life of the tree depends. It is by the osmotic action of the delicate walls of the root hairs that the tree is able to get its food from the soil. As might be seen from their nature, the root hairs are

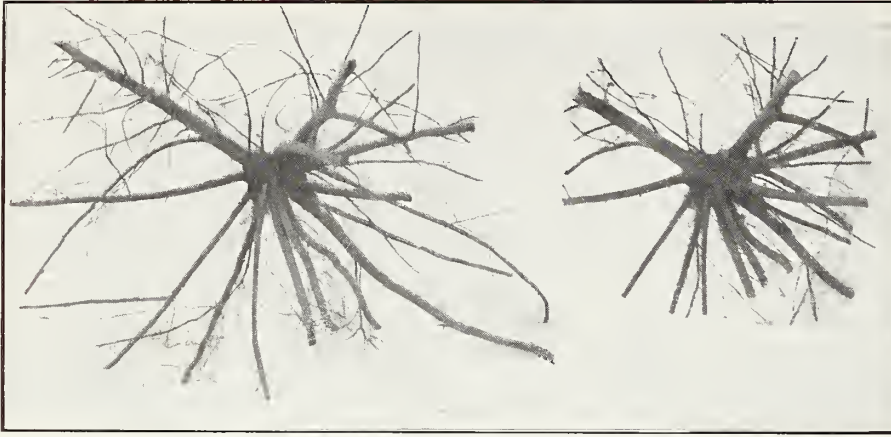
very easily injured and killed by drying. Unless they are constantly in contact with moist soil particles, they die and the leaves of the tree above ground quickly tell of the loss below the surface. When root hairs are exposed to the air they at once begin to lose moisture, and as the moisture dries away, their vitality diminishes proportionately. It is upon these delicate little organs that the life of a tree depends, and its growth and vigor is proportionate to their activity and numbers. Yet one would scarcely believe that there was anything delicate about the roots of trees, to see the way they are exposed by some planters.

Heeling In and Covering—From the time trees leave the nursery row until they are permanently planted, they should be exposed just as little as possible. They should never be left open to sun or wind or air when it can at all be avoided. Tree should not be laid out while holes are dug, nor under ordinary circumstances should those for a whole row be laid out at one time. Trees waiting for planting should be heeled in with moist earth about the roots, and only taken out of the ground when actually needed for setting. To save time when planting, trees may be placed in a wagon and covered with wet straw or fertilizer sacks. As the planting proceeds, the trees can be taken from the wagon as wanted. The method just outlined stands in striking contrast to the plan, or lack of plan, where tree roots are exposed for hours to the injurious effects of sun and wind. Moreover, the success as shown by vigorous living trees will stand in striking contrast to the results of the planting where trees are not carefully covered.

Transplanting Seedlings—If a tree could be taken out of the ground without the loss of root hairs, it could be trans-



PLANTING THE TREE



ROOTS OF A TREE BEFORE AND AFTER PRUNING

planted without dropping a leaf. If it were planted in as good a soil as that from which it was taken, the tree would never know that it had been transplanted. The loss of trees in transplanting is largely in proportion to the loss of root hairs. It is possible, with careful handling to prevent exposure, to transplant thousand and thousands of seedlings without the loss of a single tree. The larger the tree to be transplanted, the necessarily greater loss of root surface; yet, with care, large trees may be moved even in summer without the loss of foliage.

Transplanting Large Trees—Last July, to make place for a new building, my foreman transplanted a large and valuable evergreen without the loss of a single cone. He first soaked the ground thoroughly about the roots to make the earth cling to them; then he dug a great circle about the tree and undermined it, raising it out of the hole on timbers, and carefully skidded it to a new hole dug to receive it. The crevices were carefully packed in with earth and the hole filled and leveled up to the surface. The ground was kept moist about the tree, and as the root hairs were never exposed, the tree showed not the slightest inconvenience from this transplanting.

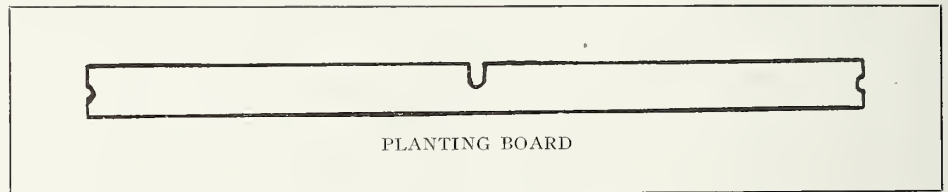
Nursery Treatment—In taking trees from nurseries and preparing them for shipment, there must necessarily be more or less exposure of the roots, but reliable nurserymen take care that this exposure is the least possible.

If properly handled, the trees are loosened in the ground with a digger or spade, and the roots not removed from the ground till the trees are to be bunched and loaded on wagons. The loads are covered with canvas while on their way to the packing sheds or heeling-in grounds. In being boxed they are packed in with damp straw and peat, and if shipped long distances the boxes are lined with waxed paper. Reliable nurserymen, who well understand the

ated roots and those that have become dried and dead. The cut surface should always show fresh, living wood. When these clean-cut surfaces come in contact with moist soil the cambium grows out over the end and forms a callous, from which new roots start very rapidly.

In trimming the roots it is best to make a sloping cut, with the cut surfaces facing downward. When such a tree is set, the cut surfaces will always come in contact with the soil, and the callous forms readily. It is thought by some that the cut surfaces facing downward cause the tree to become deeper rooted than when cut otherwise. This may have some effect on making trees deep rooted, but more, doubtless, depends on the nature of the soil.

Brace Roots—If the ground is a hard clay in the bottom of the holes it will pay to haul good earth and put a shovel-ful or two in each hole. As the tree is lined up, it should be placed so that the large or main roots are in line with the prevailing wind. It will be noticed by those handling trees that the largest or the main roots usually grow in directly opposite directions from the base of the trunk, and seldom at right angles to each other. These large roots form a sort of root axis, which are sometimes known as



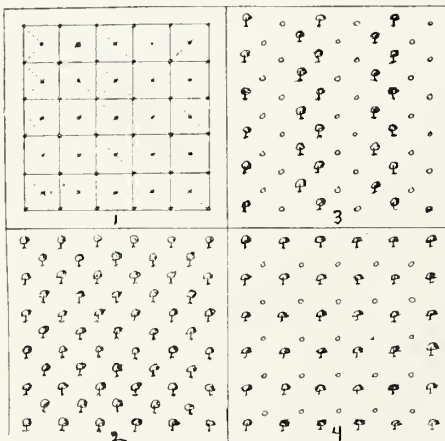
PLANTING BOARD

delicate nature of tree roots, and who guarantee to fill in gaps the second season, take good care to see that trees are carefully handled and packed. It is usually at the other end of the line that the injurious treatment comes in. Perhaps the farmer is not prepared to plant the trees, and they heat or dry in the boxes while he is digging the holes.

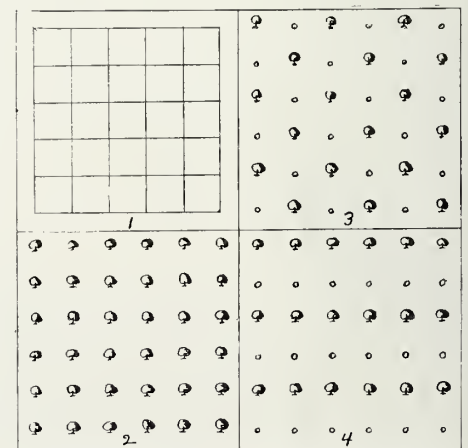
Making a Tree Comfortable—In planting a tree to make it grow—and there should be no other aim—the tree should be made just as comfortable in its new environment as possible. If the land is wet it should be drained, for trees will never thrive with wet feet. The best results are obtained by preparing the land the previous year for the setting of the trees. Clover or cowpeas plowed under in the fall will make humus the following year and keep the soil moist about the roots. Trees will often do well in poor soils and unfavorable conditions if good soil is placed about their roots, so that they get a good start the first year or so. After they once become established they can do considerable towards taking care of themselves.

Pruning for Transplanting—The hole dug for a tree should be large enough, so that the roots may be spread out naturally in all directions. Yet it is not necessary to dig very wide holes if the trees are heavy-rooted, for the roots of a tree always need trimming back at transplanting time. Cut back all roots larger than a lead pencil, leaving a clean-cut surface. Remove all broken or lacer-

ated roots of the tree. If care is taken setting the tree, so that the brace roots are in line with the prevailing wind, the tree will be firmly fixed, and not easily affected by storms. If, on the other hand, the main root axis is placed at right angles to the prevailing wind, the top is rocked backward and forward, as if on a hinge. Attention to this point will save many trees. The neglect of it is often seen where the collar of the tree works a hole three or four inches across. This, of course, causes great loss of moisture and injury to the roots. Trees should usually be tilted a few degrees towards the direction of the prevailing wind.

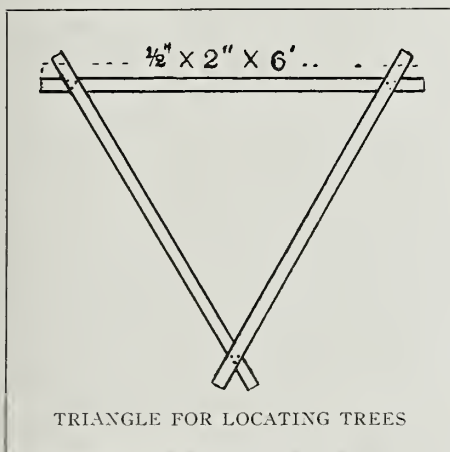


THE QUINCUNX SYSTEM OF PLANTING
1, Field staked; 2, Field set; 3, Improper thinning;
4, Proper thinning.



THE RECTANGULAR SYSTEM OF PLANTING
1, Field lined; 2, Field set; 3, Proper thinning;
4, Improper thinning.

The Planting Board—One of the quickest and most accurate methods of setting trees is by the use of the planting board. This board is usually about six feet long and four inches wide. It has a hole bored near each end, and at the middle of one side, exactly between these holes, a notch cut about half-way through the width of the board. When the ground is staked out and everything ready for planting, the planting board is placed so that the notch is close about a stake where a tree is to be set. Iron or wooden pins are thrust through the two holes of the board; then the board is lifted off one pin and thrown around



on the other, out of the way. The hole is then dug, and when the board is swung around and dropped over the first pin the notch will indicate exactly where the tree is to be set. By beveling the notch a trifle, the slope to the prevailing winds may be given by fitting the tree every time into the notch. This method is rapid, and so accurate that orchards may be put in on straight lines without the trouble of sighting the trees.

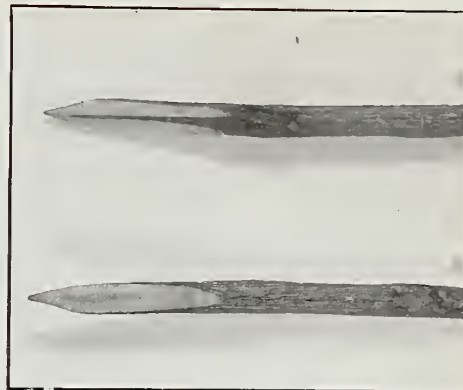
Filling in the Holes—This is the most important step in the whole operation. To get the best results, moist soil must be placed closely about the roots, so that there are no air holes or crevices. The best instrument for accomplishing this work is the human hand. When the tree is placed in position the roots are spread out and a shovelful or two of the finest and best earth thrown upon them. This should be carefully worked into the crevices with the fingers, and when the hole is about a third full, all the earth should be tramped down solid. The bigger the feet and the heavier the man, the better for the tree. There is little danger of tramping it too much, but trees often die for lack of tramping. After the roots are all covered and packed in tightly, the hole may be filled with the remainder of the earth. The surface should be left loose; tramping it would pack the soil, so that it would lose moisture and dry out the trees. A mulch of manure about each tree is a good thing to conserve moisture.

Pruning the Top—Since the root surface has been reduced in transplanting the tree, it is necessary to cut back the top in similar proportion to maintain a balance between top and root. If this is not done, when the tree comes into leaf

the foliage will give off moisture faster than the reduced roots can supply it, and so the tree is dried out and killed. With peach trees all the side branches are usually removed and the leader cut back. In most other trees all side branches are removed but three or four, and half the last year's growth on these cut back. In this way the equilibrium of top and root is restored, and if the ground is cultivated failure should not be expected.

Transplanting of Evergreens—Evergreens are notably difficult to transplant successfully. This is due to the fact that, being evergreen, they are constantly giving off more or less moisture and do not come to as complete a dormant condition as deciduous trees. For this reason, especial care is necessary in transplanting to see that the root hairs are exposed as little as possible. Simply shaking the earth from the roots of evergreen trees seems to injure them. To get the best results with evergreens they are best taken up when the earth is wet about them, as in early spring, or they may be irrigated to make the mud adhere to them. In setting they should be very carefully tramped, so that there are no holes about the roots. If these precautions are followed, as good results can be obtained in transplanting evergreens as in setting other trees.

Planting Trees Taken From Woods or Natural Forests—Many people complain of having poor results in transplanting trees from woods or natural forests. Let us look at the reason: Young trees grown in the forests, under the protecting shade of their mother trees, have almost ideal conditions of growth. The forest canopy above protects them from wind and from the intense rays of the sun, while beneath them the forest floor supplies all the necessities of moisture and plant food. To remove a tree from such conditions to an open field is to give it a great shock, if it is not very carefully handled and tended. The soil to which such a tree is removed should, by artificial means, be made to resemble as closely as possible the virgin fertility of the forest soil. As more roots are removed from a forest seedling in transplanting than from a nursery-grown tree, the top will have to be cut back more. In setting, all the spongy leaf mould should be removed from the roots, for when exposed this porous matter readily dries out. In place of this mould



SCIONS CUT IN PROPER MANNER FOR TOP-WORKING CHERRY TREES

the earth should be most carefully packed about the roots. With forest seedlings it is always best to mulch the surface of the ground about them.

Puddling Roots—It is now a common practice to puddle the roots of trees by immersing them in a thin batter made of clay and water. This keeps the air from robbing the roots of moisture, and is a good protection to the roots while planting. Trees becoming dried should always be puddled, for it tends to restore them to their natural condition. If trees are badly dried in being shipped, it is often a good plan to bury them, top and all, in moist earth for a few days before planting.

Planting of Yearling Trees—A great many planters make a practice of setting large, two-year-old nursery trees. Better results can be obtained, however, in the long run, by setting one-year-old trees. Besides costing less and being less expensive to ship, the one-year-old tree is easier to transplant, and a greater proportion of them live. The two-year-old tree has its top formed in the crowded nursery row, and therefore does not develop as well as in the open conditions in the orchard. Many two-year-olds have to be cut back to such an extent to obtain a good top that they are overtaken by the one-year-old tree, started under more favorable conditions.



ADVERTISING GOES LONG WAY
The Eugene Real Estate and Investment Company is in receipt of an inquiry for fruit and nut land from C. Shaw, of Shanghai, China, he having seen their advertisement in "Better Fruit."—Eugene (Oregon) Register.



ONE OF THE VARIETIES OF SUB-SOIL PACKERS
This tool is the basis of success in the Campbell system of dry farming

KINDS OF FRUIT TO PLANT IN DIFFERENT DISTRICTS

BY W. S. THORNBUR, HORTICULTURIST, STATE COLLEGE, PULLMAN, WASHINGTON

THE Pacific slopes of Washington and Oregon, the inland valleys and the inland uplands constitute three distinct fruit belts in which there is a marked variation in the kinds of apples, peaches, pears, cherries, plums, grapes, berries and fruits in general, which it is desirable to grow. The coastal region includes the region west of the Cascade Mountains. The inland valleys include the river basins, regions of 300 to 1,000 feet above sea level. The inland uplands range from 1,000 to 3,000 feet above sea level. Soil and climate being somewhat different in each of the belts naturally necessitate different varieties of fruits, and the problems involved in the selec-

tions of varieties which give best results in the different belts has received many years of study by the state college staff. The list which follows is intended as a guide for the varieties to plant. He can without difficulty, of course, determine for himself whether he lives on the coastal slope, in an inland valley or on an upland. It is not intended that the orchardist should plant all of the varieties enumerated, but, rather, that he should select a few of the ones that suit him best.

Certain peculiarities which appear in the list are worthy of mention. For example, the Yellow Newtown apple is found to be adapted to both the coastal

slopes and the inland valleys, but is not recommended for the uplands, while the Rome Beauty is limited to the valleys and uplands. The pears for the three divisions is the same, with the exception of the Tyson, which on the uplands replaces the Clapp, which is used in the coastal regions and the valleys.

The coastal regions and valleys take the same varieties of cherries (sweet), but on the uplands, the Centennial and the Vilne Sweet replace the Royal Anne and the Black Republicans, respectively. The sour cherries and the dukes are the same for all three sections.

Following is the classification which has been made.

APPLES

COASTAL SLOPES

Late—
Northern Spy
Olympia
Rhode Island Greening
Yellow Newtown
Blue Pearmain
Yellow Bellflower
Glowing Cool
Grimes Golden
Ortley
Medium—
Gravenstein
King
Duchess
Early—
Yellow Transparent
Williams

INLAND VALLEYS

Late—
Spitzenberg
Yellow Newtown
Rome Beauty
Winesap
Grimes Golden
Jonathan
White Winter Pearmain
Delicious
Medium—
Gravenstein
Duchess
King
Winter Banana
Early—
Williams
Yellow Transparent

UPLAND VALLEYS

Late—
Rome Beauty
Wagner
Jonathan
Gano
White Winter Pearmain
York Imperial
Delicious
Medium—
King
Gravenstein
Duchess
Winter Banana
Early—
Yellow Transparent
Williams

COASTAL SLOPES

Italian
Silver
Hungarian

Concord
Niagara
Worden
Campbell's Early
Moore's Diamond
Moore's Early

PRUNES

INLAND VALLEYS

Italian
Silver
Hungarian

Campbell's Early
Moore's Early
Moore's Diamond
Concord
Worden
Delaware
Sweetwater
Thompson's Seedless
Flame Tokay
Hamburg
Alexander-Muscat
Black Prince

UPLAND VALLEYS

Italian
Silver
Hungarian

Campbell's Early
Moore's Early
Moore's Diamond
Green Mountain

GRAPES

Campbell's Early
Moore's Early
Moore's Diamond
Concord
Worden
Delaware
Sweetwater
Thompson's Seedless
Flame Tokay
Hamburg
Alexander-Muscat
Black Prince

Campbell's Early
Moore's Early
Moore's Diamond
Green Mountain

PEARS

Late—
Winter Nelis
Clairgeau
Medium—
Anjou
Comice
White Doyenne
Seckle
Flemish
Early—
Bartlett
Clapp

Late—
Winter Nelis
Clairgeau
Medium—
Anjou
Comice
White Doyenne
Seckle
Flemish
Early—
Bartlett
Clapp

Late—
Winter Nelis
Clairgeau
Medium—
Anjou
Comice
White Doyenne
Seckle
Flemish
Early—
Bartlett
Tyson

Medium—
Cuthbert
Marlboro
Superlative
Ruby
Early—
Antwerp

RED RASPBERRIES

Medium—
Cuthbert
Marlboro
Ruby
Superlative
Early—
Antwerp

Medium—
Cuthbert
Marlboro
Ruby
Early—
Turner

BLACK RASPBERRIES

Cumberland
Burkhart
Gregg

Cumberland
Burkhart
Gregg

BLACKBERRIES

Lucretia Dewberry
Late—
Himalaya Giant
Evergreen
Medium—
Kittatinny
Early—
Snyder
Mammoth Black

Lucretia Dewberry
Late—
Himalaya Giant
Evergreen
Medium—
Kittatinny
Early—
Snyder
Mammoth Black

Lucretia Dewberry
Late—
Evergreen
Medium—
Kittatinny
Rathbun
Early—
Early Harvest

GOOSEBERRIES

Downing
Industry
Portage
Smith
Oregon

Downing
Industry
Portage
Smith
Oregon

CURRENTS

Victoria
Wilder
Perfection
Cherry
Red Dutch
White Grape

Victoria
Wilder
Perfection
Cherry
Red Dutch
White Grape

STRAWBERRIES

Hood River Clark Seedling
Late—
Gandy
Medium—
Magoon
Marshall
Crescent
Early—
Warfield
Bederwood

Late—
Gandy
Medium—
Marshall
Glen Mary
Crescent
Hood River
Early—
Warfield
Bederwood

NUTS

English Walnuts

Franquette
Mayette

Franquette
Mayette

Other Nuts

Black Walnut
Cob Filbert
Butternut
Japanese Chestnut

Black Walnut
Cob Filbert
Butternut
Japanese Chestnut

SWEET CHERRIES

Late—
Hoskins
Lambert
Black Republican
Medium—
Bing
Early—
Royal Anne

Late—
Hoskins
Lambert
Black Republican
Medium—
Bing
Early—
Royal Anne

Late—
Hoskins
Lambert
Vilne Sweet
Medium—
King
Centennial

Lucretia Dewberry
Late—
Himalaya Giant
Evergreen
Medium—
Kittatinny
Early—
Snyder
Mammoth Black

SOUR CHERRIES

Late—
Northwest
Medium—
Olivet
Montmorency
Early—
Early Richmond

Late—
Northwest
Medium—
Olivet
Montmorency
Early—
Early Richmond

Late—
Northwest
Medium—
Olivet
Montmorency
Early—
Early Richmond

Downing
Industry
Portage
Smith
Oregon

DUKES

May Duke
Late Duke
Reine Hortense

May Duke
Late Duke
Reine Hortense

May Duke
Late Duke
Reine Hortense

Victoria
Wilder
Perfection
Cherry
Red Dutch
White Grape

PEACHES

Early—
Alexander
Triumph
Early Crawford
Charlotte

Late—
Late Crawford
Medium—
Elberta
Foster
Hills Chili
Wheatland
Early—
Early Crawford
Hale

Late—
Wonderful
Foster
Medium—
Wonderful
Foster
Early—
Alexander
Triumph
Champion
Early Crawford
Hale

Hood River Clark Seedling
Late—
Gandy
Medium—
Magoon
Marshall
Crescent
Early—
Warfield
Bederwood

APRICOTS

Early—
Gibb
Moorpark

Early—
Early Golden
Moorpark
Medium—
Hemiskirke
Royal

Early—
Gibb
Moorpark

PLUMS

Abundance
Peach
Bradshaw
Wickson

Abundance
Peach
Bradshaw
Wickson

Abundance
Peach
Bradshaw
Wickson

Black Walnut
Cob Filbert
Butternut
Japanese Chestnut

THE GRAFTING AND TOP WORKING OF FRUIT TREES

BY PROFESSOR O. B. WHIPPLE, BOZEMAN, MONTANA, FORMERLY OF AGRICULTURAL COLLEGE FORT COLLINS, COLORADO

It is becoming more and more apparent that certain localities and soils are peculiarly adapted to growing particular kinds and even varieties of fruit. Commercial fruit-growing localities are making their reputation by being able to grow a few varieties well. So each new fruit country must go through an experimental stage when a host of varieties is being tested to determine those which are best adapted to its peculiar conditions. Then in the growth of each new fruit country there comes a time when the grower will have to solve the problem as to what to do with the undesirable varieties. Shall he pull them out or graft them over to better varieties? Systems of grafting over old trees have long been practiced, and experience has proven that, if properly done, top working brings quicker returns than the replanting of young trees. It is not uncommon to see a fairly good crop on the three-year-old top of a top-worked tree. Trees properly worked over give tops as desirable, and sometimes more so, than trees of the same variety grown from first-class nursery stock.

Top-working as a means of establishing a weak-growing variety on a stronger root system than its own is now coming into favor. The Rome Beauty when on

its own roots is, on the best soil, an indifferent grower; but, when worked on some strong-growing stump, it makes a very satisfactory tree. Some varieties of apple, susceptible to attacks of root rots,

make a good top. Do not expect the top-working of apple to pear or vice versa to be a success. The writer has seen peach grafts start very vigorously upon apricot, and plums upon peach trees. I



FIGURE 2—An attempt at working over an old Transcendent crab tree, showing about as good a selection of stubs as is possible with such a subject. FIGURE 3—The same tree one year later with quite a promising top, but the enlargements at the base of the scions show that the union is not perfect. FIGURE 4—As the top grows heavier the unions are not strong enough to hold it, and this is too often the result by the third or fourth season.

could, no doubt, be successfully grown on roots of varieties which are apparently resistant. The Northern Spy seems to be a striking example of an apple tree root free from the attacks of woolly aphid, and is sometimes planted and later worked over to other varieties. Broken and diseased limbs may be saved by grafting, and progressive fruit growers who desire to test new varieties can best do it by grafting a few scions into bearing trees.

Some years ago the fruit grower looked upon the practice of grafting as a mysterious art and upon the man who went about doing the work as a sort of a wizard; as a matter of fact, it is so simple that any careful orchardist can, and should, do it himself. All our common fruit trees can be easily grafted or budded. The apple and pear may be intergrafted upon each other and the same may be said of the apricot, almond, peach and plum. But in practice we do not carry on such wholesale mixing, and it may be said that the apple and pear never make a good union. While such a combination may unite, we can hardly expect the union to be perfect enough to

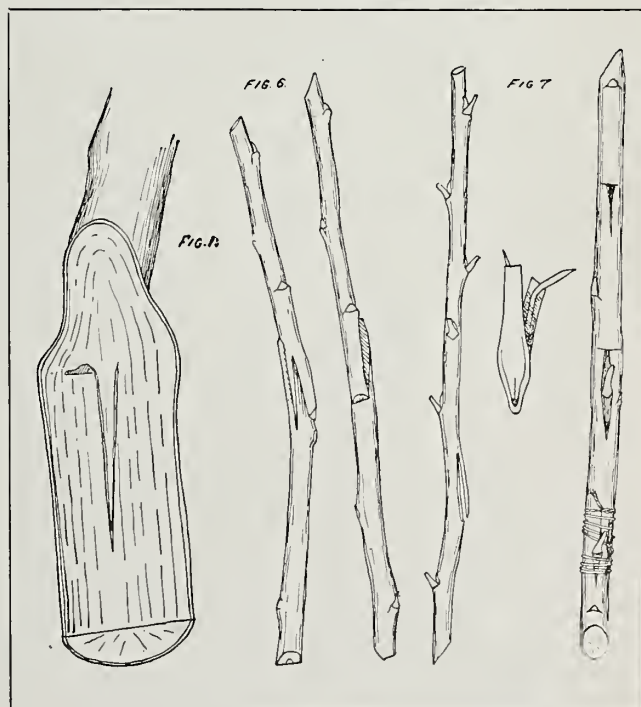
have observed plum trees top-worked to peach with perfect unions, and the ten-year-old tops bearing excellent crops of fruit. In this case, the combination seemed to result in a dwarfing of the peach top, though the growth is by no means stunted. So in practice, we stick largely to the intergrafting of different varieties of the same kind of fruit.

To understand the principles underlying graftage, the orchardist should know

Continued on page 48



FIGURE 5—Showing proper selection of stubs.



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HOOD RIVER, OREGON

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THE COST OF HARVESTING AN APPLE CROP

REALIZING that it will be of general interest to our readers, and in particular to those who have young orchards, to know the approximate cost of harvesting an apple crop, the editor of "Better Fruit" submits the following figures. In explanation I desire to say that the gross cost per box is practically exact, that is, forty and one-half cents; but in itemizing the account it is impossible to be exact without going into too small fractions of a cent. On account of the difficulty of changing the men from one job to another, it is impossible to determine the exact figures. The first four items in the following summary are exact, but the last six items in the list are approximate.

Packing	\$0.06
Hauling .....	.03
Box .....	.10
Paper .....	.05 1/2
Wiping and grading .....	.05
Nailing .....	.01
Orchard hauling .....	.01
Picking .....	.07
Help in packing house .....	.01
Box making .....	.01

To this might be added an approximate estimate of the cost of cultivating and pruning of about five cents per box, and the spraying will probably cost five cents per box per year, making the cost of production about fifty cents per box.

There are, of course, many features that would vary these figures and the total cost. For instance, the size of an orchard, the facilities for handling and

packing, and the average yield per acre. The editor feels that, in the above itemized list, the cost of wiping and grading could be reduced possibly to three cents and picking to four cents, making a possible saving of five cents. The estimates of different growers will vary all the way from fifty to sixty cents as the probable cost of production of a box of apples, and some districts claim that apples can be grown for thirty-five cents per box, which we do not doubt. In barrel districts or where ordinary varieties are grown and the same care is not put in wiping, sorting and grading the apples, the cost of production will be, of course, materially less, but the above figures may be of some interest and some value as an example of what it has cost to produce a crop of high grade apples like Spitzenbergs and Newtowns, handling them carefully, sorting, wiping and grading properly, and packing them in the best possible manner.

CO-OPERATION

THIS subject is commanding great attention and growing interest from the fruit grower throughout the entire Northwest. The subject is not a new one, the advantages are not unknown. In Denmark there are some thirty thousand farmers in an association handling eggs. There are associations handling various other products, and associations handling meats and other farm products. Denmark probably has more co-operation than any other nation in the world, and, if we are correctly informed, and we believe we are, Denmark is the richest nation per capita in the world.

Since the co-operation among the cotton growers in the South the price of cotton has increased from seven cents, we understand, to fourteen cents this year. California orange growers were making only a moderate profit until they formed the Citrus Fruit Exchange, and we understand now that the orange growers in California are making good money and are universally prosperous.

About two years ago Mr. G. Harold Powell, of the Department of Agriculture at Washington, D. C., informed us that in his opinion there would be more co-operation in the Northwest and that possibly the time might come when the three states might distribute the fruits through one central head for marketing. At the Spokane National Apple Show an informal meeting was called, there being present some three or four hundred growers from all districts of the Northwest, the main subject up for consideration being the marketing conditions. Mr. W. N. Irish of North Yakima was elected chairman and requested to arrange for a meeting, together with a place of meeting and a date, and to invite delegates from all the different sections to discuss marketing conditions of the Northwest.

In a recent issue of the Oregonian it is announced that Mr. H. C. Atwell, of the Oregon State Horticultural Society, will call a meeting of growers from the three states for the purpose of giving this subject consideration, with a view to forming an incorporated company with a capital

of five hundred thousand dollars, or such sum as may be necessary, for the purpose of marketing the crops of the fruit growers of the Northwest to better advantage, all of which seem to indicate that in the near future the subject will be given the attention it merits, and it is to be hoped that better plans of marketing will be worked out. But it is a big undertaking and whenever the movement is started it will require loyal support. No doubt certain discouragements will be met with in many ways.

If the crops of these three states are to be distributed by one organization, of one thing we are sure: it will require a man with a mighty big head, a man absolutely familiar with market conditions throughout the middle West and East, a big, broad-minded man who knows his business, one who will be fair and square to everybody. For such a man we probably will have to pay a salary something like they pay railroad presidents, and if the fruit growers can secure that manner of man for a manager we have no doubt his big salary would be well earned by the service he would render to them.

BETTER FRUIT is now well along in its fifth year. During the four and a half years that the magazine has been published it has been the constant aim of the editor to make it a strictly first-class fruit paper, devoted to the fruit industry of the Northwest. We feel that in this effort we have been measurably successful. It is of course apparent that, considering the low subscription price, the income of "Better Fruit" depends almost entirely on its advertising. In line with the general policy of the paper, we have always endeavored to publish only advertisements that are reputable. It is also apparent, however, that it is impossible for the editor to guarantee or have personal knowledge as to every advertisement that is offered. All news articles published, which are written by the editor or at his suggestion or under his direction, are vouched for as being substantially correct. All such articles are either signed or carry in the body of the article the evidence of their authoritative authorship. Any article not bearing such evidence of its authorship is not so vouched for, but is simply given for what it is worth. We have constantly endeavored to secure articles covering practically every phase of the fruit business. These articles are contributed by men who by reason of long experience are qualified to speak with authority upon the subject which they discuss. As to such articles, we guarantee the character and standing of the authors, but of necessity we cannot in all cases guarantee the various plans, systems or theories advocated.

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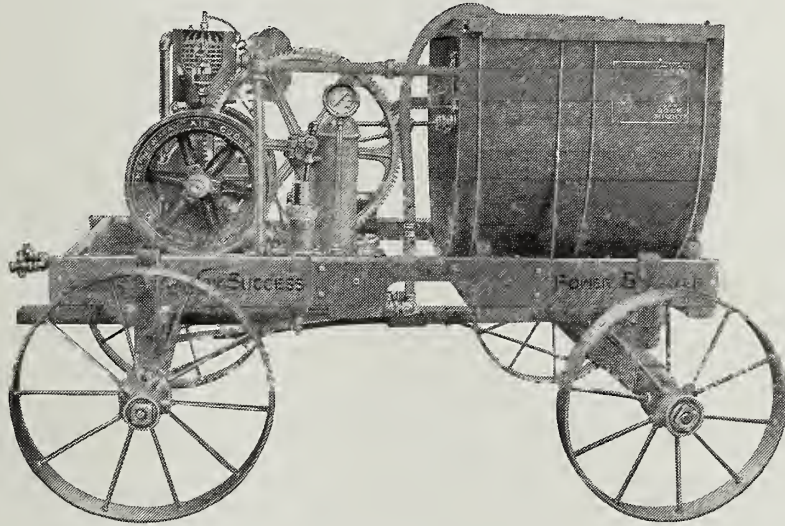
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THE GRAFTING AND TOP WORKING OF FRUIT TREES

Continued from page 43

how the stems of our fruit trees grow. He should understand that growth in diameter only takes place in a very small region between the bark and sap-wood. This part of the stem is called the cambium. In this thin layer of tissue the cells are still active and capable of diversion, while the activity of each succeeding layer, on either side, grows less and less.

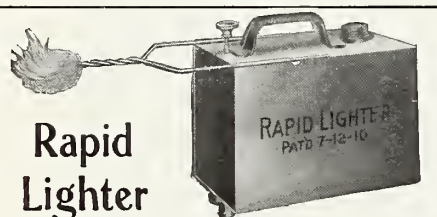
When the limb is split to insert a scion the cleft does not grow together along its entire length, as some may think. The cells in the cambium layer may produce a growth that may, to a certain extent, fill up the cleft and cover over the stub, but the tissues of the stock and scion only make a true union where the cells of the cambium layers of the two come in contact. Figure 1 is a pen drawing of a section through a stub grafted two years before. The stub was kerf-grafted and shows that no union has taken place between the woody tissues of the stock and scion.

The important point in grafting is to see that the cambium layers of the stock

and scion are matched at some point.

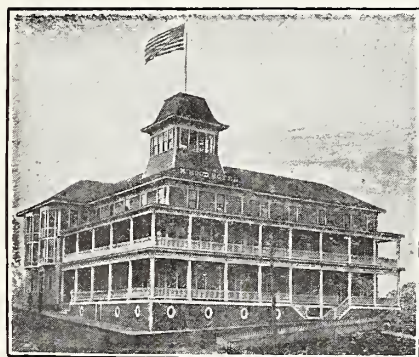
When growth is active we say the bark "peals." Budding is done during this period, not only because the ease with which the bark separates from the wood simplifies the work of inserting the bud, but as growth is more active, the tissues of the bud and the stock are more likely to unite.

In the working over of old trees it is well to bear in mind that trees which show a poor growth in the orchard are seldom worth the time it takes to graft them. This is very often true in the case of some varieties of apple. For instance, I have never yet seen a Yellow Transparent stock grow a top worth the space it occupied. The same is almost invariably true of tops on Wagener, Duchess, Missouri Pippin, Wealthy and Hyslop crab. In fact, it seldom pays to top-work any crab. Figures 2, 3 and 4 are from a series of photographs of a Transcendent crabapple tree, the first showing some grafts one year old and some just set; the second figure, the same tree one year later (quite a promising tree); and the third figure the result at the end of the third season, almost the entire top blown off by a heavy wind. The grafts were Winesap and were set in a kerf, not a cleft. As a rule the weaker growing varieties are very unsatisfactory stocks upon which to work other kinds. Then the wisdom of top-working stone fruits would almost seem questionable. While good tops may be grown on either peach, plum, apricot or almond, it is doubtful whether these tops will bear much quicker returns than young trees set in the place of the old ones. Still we would not care to discourage a practice most successfully followed by some growers, but will say that



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only strong-growing young trees under the most favorable conditions are worthy of such an attempt at renewal.

Various methods of graftage may be employed in changing over the top of the old trees. Some method of scion grafting is generally used, although it is not uncommon, in stone fruits especially, to bud into new growths. Of the methods of scion grafting two are commonly used in the West—cleft grafting and kerf

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grafting. Those who have practiced grafting in the East as well as in the West, claim that the wood of Western fruit trees is much more brittle, and that on account of excessive splitting, cleft grafting is more difficult in the West. This has led to the introduction of a new system, which is locally known as kerf

grafting. Cleft Grafting—The operation of cleft grafting is very simple. The limb to be grafted is sawed off squarely, leaving a smooth, solid stump. The stub is split down about two inches with a grafting chisel or knife. The chisel is removed and the cleft is wedged open with the wedge on the back of the knife, or one provided for the purpose. The scion should be cut to contain three buds, and should be of strong, well-matured wood of the previous season's growth. The lower end is then trimmed to a wedge, leaving the first bud a little below the top of the wedge, and cutting the edge of the wedge opposite the bud a little thinner than the other. The scion is then driven firmly into place with the lower bud to the outside and a little below the top of the cleft, being sure to bring the inner bark on the outer edge of the wedge in contact with the inner bark on the stub. This is the important step in grafting, as it is between these parts that the union takes place. Sometimes the inexperienced grafter makes the mistake of setting the scion flush with the outer edge of the stock. On large stubs with thick bark it would be almost impossible to set a scion more

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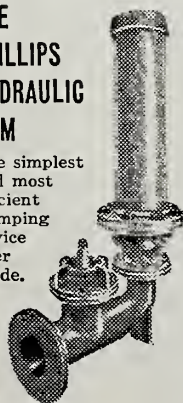
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ilily matched than in this way. Some advocate setting the scion on a slant, the point of the wedge toward the center of the stub. This insures a contact of the cambium layers where they cross, and is a good suggestion, since a point of contact is sufficient for a good union. With a scion properly set in each edge of the cleft—providing the stub is large enough—the wedge is removed. This allows the cleft to tighten on the scions, the greater thickness of the outer edge of the wedge-shaped portion of the scions insuring greater pressure at this point. With the removal of the wedge the cleft should hold the scions firmly in place. Wax should now be applied to all cut surfaces, even to the tips of the scions. Special pains should be taken

to see that the stub is well covered between the scions and the cleft waxed as far as it extends down on the sides of the stub. This prevents drying out and it is quite important that it be thoroughly done.

Kerf Grafting—This system of grafting differs little from inlaying. The stub is prepared as for cleft grafting, but instead of splitting, saw cuts are made on opposite edges of the stub and trimmed to thin V-shaped grooves with a saddler's knife. The scion is then trimmed to fit, driven firmly into place and waxed as in cleft grafting. With a little practice the scions may be set as firmly as in cleft grafting. It is claimed that this method has the advantage in speed, and that the scions are not

as easily blown out in early summer. Scions are lost by both methods, and if properly performed, one is probably as good as the other. It does have the advantage in that more scions may be set in large stubs, and thus hasten the process of healing. The same care must be used in setting the scion to insure a union. The latter system seems especially adapted to working with stone fruits, where splitting is even more noticeable than in the apple and pear. Sharp tools which give a smooth cut surface are essential in all grafting work.

Bark Grafting—Some advocate another method of grafting known as bark grafting. In this case, the stub is cut as before, the scion is cut with a long bevel on one side and slipped between the bark



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and sapwood. It is generally necessary to slit the bark at the point of insertion, and very often the bark is removed from the base of the scion up to the top of the sloping cut. The stub is bound with waxed string or other material to hold the scions firmly and it is then waxed as in the cleft-grafted stub. The system really has no advantages over others, unless when compared with cleft-grafting in working large stubs.

Terminal Grafting—Another style of grafting sometimes employed is that known as terminal grafting. This work is generally done in the latter part of June or just as soon as new growth that has matured enough to show a terminal bud may be secured. On old trees such wood would be found in June. A twig that has completed its growth may be picked out by the presence of a well formed terminal bud at the tip, and full grown, or practically full grown, terminal leaves. The scions are cut three or four inches long and the leaves practically all trimmed off. There are different ways of inserting the scion. The most common method is to cut a vertical slit in the bark of the stock, trim the lower end of the scion with a long sloping cut on one side and then slip it under the bark at an angle of about 45 degrees with the slit. The cut surface of the scion should rest upon the wood of the stock. It is not necessary to wrap or even wax the wound.

The scions start into growth the same season, but the top of the stock is left until the following spring. The method seems to work well. It may prove a

practical way of supplying lower limbs on young trees headed too high. When one neglects to remove the top when such grafting is done in the lower part of old trees, these scions readily form fruiting wood, generally bearing the third season. It is a suggestion that it would be the proper course to take as a means of getting specimens of new varieties in the shortest length of time.

There is much to be gained by the proper selection of stubs into which scions are to be set. A too common practice is to remove the whole top the first year and graft all the stubs. It is surprising that some good results come from such a practice. More often, however, this proves too much for the tree and it fails even after the grafts have made a good start.

They may linger two or three years and then die from no other cause than the severe cutting back, though the growers are prone to attribute it to some other affliction. The cutting away of the greater part of the top seems to give good results, and may even be advisable in top-working stone fruits. The pear will stand much more

abuse in this respect than the apple. A far better plan in all cases, is to cut away only enough limbs to set scions for a good top. This will generally be about half of the tree, as six stubs will, in most cases, provide for a good top. The working of more stubs results in too dense a top or necessitates their removal later. The remaining limbs may be shortened, but some foliage is needed to protect the stubs and trunk from sun-scald as well as to supply nourishment. If the stubs are well chosen the remaining limbs will do much to protect the young grafts from wind, and especially from being brushed out by passing teams and orchard machinery. It is well to choose inside limbs for grafting, as they are best protected, but care must be taken

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Owing to unavoidable circumstances the owner offers her orchard, located 7 miles from Watsonville, California, Corralitos district, at a great sacrifice. 51.65 acres; 3,785 trees, 6 to 9 years old; 826 Bellflowers, 1,140 Newtowns, 1,219 Spitzenbergs, balance assorted. This year's crop 10,500 packed boxes. Four-room house, packing house, blacksmith shop, barn and wagon house, 6,000-gallon cement tank, horses, harness, trucks, wagons, engine, spray outfits, tools, etc. Price \$16,000. A little over \$300 an acre. Orchards in same class are bringing not less than \$500 an acre.

For full particulars and photos of this and other good buys, write

Farm & Forest Realty Company

WATSONVILLE, CALIFORNIA

Alpine Orchard Tracts

Are selling fast. Our prices, terms and location are right. We have a booklet with handsome cover giving you information about these, also a catechism of questions and answers concerning Apple Orchard Lands, and a pamphlet showing many ways of making money while the trees are coming into bearing. If you are a prospective customer we would be pleased to send these to you.

OREGON APPLE ORCHARDS CO.

804-5 Lewis Building

Portland, Oregon

not to contract the head of the tree too much. It should be borne in mind that top-worked trees tend to grow upright, but it is a difficulty which may be largely overcome by judicious pruning.

After the scions have made one year's growth much of the remaining top may be removed, but it should seldom all be removed from old trees before the second year. If some stubs have met with accidents or have failed to start the scions, or if the shape of the tree or a scarcity of scaffold limbs has prevented a full top being placed the first spring, it may be completed the second.

While we sometimes see grafts doing nicely in stubs six inches in diameter, it is very doubtful whether such grafts will make a strong union or a long-lived tree. The wisdom of working limbs over three inches in diameter is to be doubted. In the choosing of stubs the grafter should remember that large wounds properly made, heal more readily than large stubs. Choose the smaller limbs for

grafting, even though the later removal of the top may necessitate the cutting of larger limbs lower down. It is better to raise the head of the tree than to work large stubs. Figure 5, showing a two-year-old top on a pear tree, will illustrate this point; notice the large wounds below the grafted stubs.

The ideal time for grafting is just as the buds are beginning to swell. While scions may be set earlier, there is danger of their drying out before a union is established. Should one care to prolong the season, it is better to run late than to begin early. The opening of the season will vary from the first of March to the first of April, or even later in some parts of the state, and may be extended until the first leaves are practically full grown. Good results cannot be expected from scions set later than this. Some go through the orchard in winter and remove the tops of the stubs that are to be grafted, cutting them at least a foot above where the scions are to be placed.

This saves some time, and by hauling the brush out before the grafts are set it saves some of them from being knocked out by careless men in removing it later. When ready to graft, the stub is re-cut from a foot to eight inches lower.

Since the removal of any considerable part of the top often exposes the body of the tree to the direct rays of the sun, it is well to whitewash the trunk and main branches. The whitewash reflects the rays of the sun, and by such an application many cases of sun-scald may be avoided. A good whitewash may be prepared by using one pound of good quicklime to each gallon of water. The addition of a pound of salt to each three gallons of the wash tends to make it stick better. This can best be applied with a spray pump. A good coating can only be secured with two applications, the second to follow as soon as the first is dry.

It is well to say a word about the selection of scion wood for grafting. The

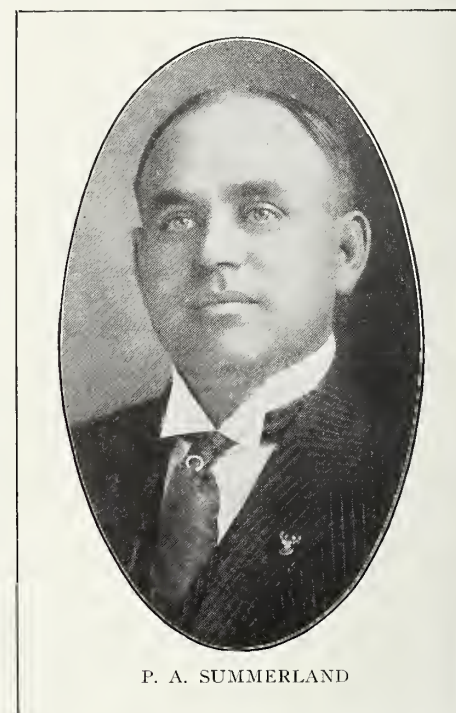
DURING the month of June, 1910, Mr. P. A. Summerland was appointed general manager of the Vera Land Company, of Spokane, Washington, and at once began the selling of Vera irrigated lands. That he has been successful is evident from the fact that the entire Vera project has been sold, and beginning November 1st he took up the duties of general sales agent for the Modern Irrigation and Land Company of Spokane, which owns "Opportunity," a big irrigated orchard project located about two and one-half miles from Spokane.

Mr. Summerland, who is perhaps one of the most successful land operators in the Northwest, started on an extensive trip east immediately after the National Apple Show in Spokane, which was held November 14 to 19. He placed a fruit exhibit at the Chicago Apple Show simi-

lar to that which he had at the Spokane Apple Show for the Opportunity project.

Much credit is due Mr. Summerland for his untiring efforts in the development and upbuilding of the Northwest. Truly speaking, he is an empire builder; he plans to do things and does them in a way that is remarkable, to say the least. His ability and foresight in presenting to the people the opportunities of the Northwest has brought wealth, comfort and happiness to all those who bought land on his advice.

The general offices of the Modern Irrigation and Land Company, owners of "Opportunity," will be located at 326 First Avenue, Spokane, where Mr. Summerland will be pleased to answer any inquiries from "Better Fruit" subscribers regarding irrigated land in the Spokane country.—Contributed.



P. A. SUMMERLAND

In the Famous Hood River Valley

800 acres fine apple soil—Just the thing for colony.

WRITE

GEO. D. CULBERTSON & CO.

Leading Land Agents

HOOD RIVER, OREGON



THE HOOD RIVER DISTRICT LAND CO.

HOOD RIVER, OREGON

Can supply you with a great variety of the very best

APPLE LAND

In the Famous Hood River Valley and District

If you live here the union will pack your fruit like this, and will place it in the big markets of the world.

And The Hood River District Land Company will sell you the land on the best terms possible and at the most moderate prices.

Anything from raw land at \$50 an acre to a fully developed orchard at prices which we will quote you upon application.

COMMUNICATE WITH US

SMITH BLOCK, HOOD RIVER

LONG DISTANCE TELEPHONE 175

WHEN WRITING ADVERTISERS MENTION BETTER FRUIT

The Famous Hood River Valley

This year's apple crop exceeded highest estimates by 33 per cent. The larger orchard owners find that they have more land than they can attend to. They must sell off parts in order to keep their apples up to standard. When this year's crop reports reach the East, **PRICES OF ALL FRUIT LANDS ARE SURE TO RISE.** We are listing all raw and improved lands possible at present prices. We have for sale tracts of raw land, 10 to 1,000 acres, and young or bearing orchards, 5 to 100 acres.

INVEST THIS FALL TO GET THE BENEFIT OF THE SPRING RISE IN PRICES

JOHN LELAND HENDERSON, Inc.

Portland Offices:

E. E. Goff, 302 Lumbermens Building
J. L. Henderson, 600 Chamber of Commerce

HOOD RIVER, OREGON

man who is interested in his bearing orchard has early learned that the individual trees in the plantation show a great variation, especially in productiveness, and very often in the size, color and quality of the fruit. Some of this variation may be accounted for in various ways, but after all, we are coming to believe that, environmental conditions being equal, no two trees are alike in bearing habits. It is a natural variation. There are trees that never bear well and scions from such trees will, no doubt, produce trees very much like them. In the selection of grafting wood it is well to bear this in mind. Mark your favorite trees and select scion wood from them.

The wood used should be one year old, strong and well matured, but not overgrown. The terminal shoots from trees that have made a growth from twelve to eighteen inches make excellent scions. The question is often asked as to the

use of watersprouts. The term watersprouts may mean different things to different people. By watersprouts we generally mean rank growth from adventitious buds; and such growths with immature tips, weak buds far apart and pithy centers make very poor scion wood.

Otherwise, any new wood with well developed buds, comparatively close together, may be used for scions. The statement sometimes made that watersprouts never produce fruit is erroneous.

Scion wood should be gathered in the fall, preferably as soon as the leaves

MARKET CONDITIONS

MARKET reports, newspaper articles and correspondence received by "Better Fruit" indicate that the apple crop this year in all instances has not been handled to the best advantage, and consequently some growers may receive less than they have been anticipating. To sum up the consensus of opinion, it would seem that there has been something lacking somewhere, and we believe we are justified, from the information at hand, in assuming that the apple crop of

the Northwest in particular has not been properly distributed. It is apparent that larger quantities have gone to the big cities like New York and Chicago than have been necessary, for the reason that many of the smaller cities have been to a greater or less extent ignored. On account of improper storage facilities at home, nearly all fruit sections have rushed their fruit onto the market all at once, and many growers, not understanding market conditions or knowing how to take advantage of storage or how to have their crop handed out in a systematic way, have sent it to some concern to be put on the market and sold out at auction on arrival. Reports indicate this to be true. Late winter varieties, instead of being kept for later use, have been put on the market along with the late fall or early winter varieties; but there are various movements on foot which will probably lead to a better understanding of market conditions, more co-operation and more intelligent marketing.

FOR SALE

In the Rogue River Valley.

Owing to the amputation of my foot, I will sell at a bargain my eight-acre fruit ranch, five miles from Medford, Oregon, and a quarter mile from the station of Phoenix, Oregon, on the Southern Pacific R. R.

Consists of a 6-room house, newly painted, porcelain enameled sink and running water in kitchen; 2-story tank house, tank 9x9; barn, with stalls for two horses and two cows; tool house, blacksmith shop, wood shed and hen house.

Orchard consists of 180 20-year-old trees, balance from 1 to 6 years old; about one-third acre of grapes and a few prune, almond and cherry trees.

Two fine wells and small creek running through the place.

Cultivator, gasoline engine, spraying outfit, pruning shears, ladders, shovels, hoes, rakes, etc.

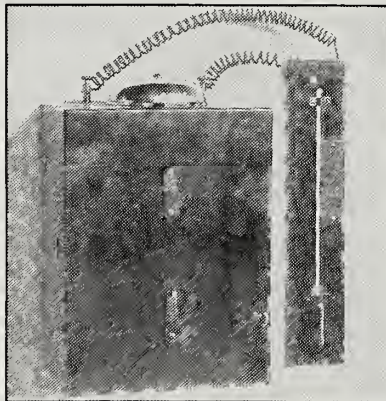
Place netted 25 per cent on price asked this year.

Address, if interested, P. O. Box 293, Medford, Oregon.

Have Your Own Weather Bureau

Get a Cedarborg Frost Alarm and be sure and to get your frost warning in time. Write and let us tell you how to save money by getting your order in before the rush.

The
Cedarborg Engineering Co.
808 Twentieth Street, Denver, Colorado



G. Y. EDWARDS & CO.

HOOD RIVER, OREGON

Our Specialties:

Fruit Lands, Orchards and Raw Lands

Get our literature and list of orchards

WRITE US FOR PARTICULARS

WHEN WRITING ADVERTISERS MENTION BETTER FRUIT



IF YOU CONTEMPLATE BUYING AN APPLE ORCHARD

Is it worth anything to you to buy in a locality that is recognized the world over as producing the finest apple grown?

Is it worth anything to you to know that the highest award and the highest per cent ever given to both Spitzenberg and Newtown apples was awarded to Hood River at the National Apple Exposition at Spokane, November, 1910, by the three most noted judges of fruit in America?

Is it worth anything to you to know that the American Society of Pomology ranks the Spitzenberg as the only perfect apple and the Newtown next?

Is it worth anything to you to own an orchard where the community devotes its time exclusively to the raising of apples and strawberries, and is the only fruit section in the world where its fruit growers own their own irrigating systems, shipping warehouses and cold storage plant?

Is it worth anything to you to locate in a community that appeals to people of intelligence and refinement, and where home life is ideal in all those things which contribute to the betterment of mankind?

For the first time in the history of Hood River we are offering 5 and 10-acre carefully selected tracts on easy terms. The plan is to clear, plant and care for these tracts for a period of five years. In order to insure the delivery of a high class commercial orchard they have secured the services of **George I. Sargent**, an eminent Hood River orchardist, to superintend the work.

These orchards are being sold on unusually favorable monthly payments during the period of five years. Opportunities for small investment in Hood River are becoming fewer every day, so that any one interested should investigate without delay.

DETAILED INFORMATION AND REFERENCE WILL BE FURNISHED UPON REQUEST

Hood River Apple Orchards Company, Hood River, Oregon

have fallen, and stored until spring. The object is not to avoid winter injury, as some think, but to keep the scions in a dormant condition. Few realize that buds complete the resting period early in the winter, and may, under favorable conditions, begin to swell before the first of January. While the unobserving man may say there is no difference in the buds of the young growth in early December and in February, there may be quite a marked difference in some climates. Our open winters in the Middle West are especially liable to start early growth. The object of keeping the scions dormant is to allow time for a partial union before the buds are started into growth by the warm days of the grafting season. Scions with

buds well swollen often throw leaf surface before a sufficiently strong union has been made to support them. The result is the exhaustion of the stored-up food supply and moisture of the scion to a point which may cause its death.

Continued in the January number

◆ ◆ ◆

Almost the whole world knows of Hood River as a place that produces the best fruits, and all of Hood River Valley should know, and could know, that there is one place in Hood River, under the firm name of **R. B. Bragg & Co.**, where the people can depend on getting most reliable dry goods, clothing, shoes and groceries at the most reasonable prices that are possible. Try it.

ASHLAND DISTRICT *of the* ROGUE RIVER VALLEY

Orchards near the City of Ashland, Oregon, hold the highest records for productiveness per acre, in comparison with all the other orchard localities of similar size.

A booklet descriptive of the many resources of this city and the surrounding country will be sent **free** on applying to the Publicity Department of the Ashland Commercial Club, Ashland, Oregon.

HOW YOU CAN SECURE AN ORCHARD THAT WILL PAY FOR ITSELF

These orchards are located in the deep volcanic ash fruit soil of the great Columbia River Basin, less than 100 miles from Portland, Oregon, near Mount Hood and the famous Hood River Valley, with railroad depot on the property.

If you are interested, and have a little money, write, today, for full information in regard to this opportunity, the like of which you will not have again soon, and for "How I Can Secure an Orchard That Will Pay for Itself."

DUFUR DEVELOPMENT COMPANY

91 Third Street

PORTLAND, OREGON

Always Remember

Scenic beauty ;

Intellectual and cultured people ;

Ideal climate, soil and balanced rainfall ;

Absolute organization among the growers (they own their own irrigating systems, shipping warehouses and cold storage plants) ;

Highest returns ever received obtained annually ;

Spitzenbergs and Yellow Newtowns having

QUALITY
QUALITY
QUALITY

Any one of these may be found in some other fruit section,

But,

They can only all be found in

Hood River, Oregon

The handsomest booklet ever published, describing Hood River, will tell you why and how.

Secretary HOOD RIVER COMMERCIAL CLUB will gladly send it to you.

OKANOGAN APPLE LANDS

OF THE FAMOUS SIN-LA-HE-KIN VALLEY



BIRDS EYE VIEW OF LOOMIS, WASHINGTON, OVERLOOKING THE LOWER SIN-LA-HE-KIN VALLEY. SNOW CAPPED MT. CHEPACA IN THE DISTANCE

We have recently purchased three thousand acres of "allotted" Indian land in this valley, all of which produces the finest flavored and highest colored apples grown. This land was allotted in 1885 to the Moses Indians in tracts of 640 to 2,200 acres, and was selected on account of the mildness of the winters, and will grow any fruit or vegetable grown north of California.

The elevation of this land is 1,200 to 1,700 feet, and 250 to 300 days of sunshine guarantees the high color of the fruit grown in this beautiful valley. Seventy-five per cent of every tract is ready for cultivation.

We have just finished planting sixty-five acres, and wish to continue the development of this property, and will for this reason sell thirty ten-acre tracts for \$125 per acre, this price to include a perpetual water right for the complete irrigation of the purchased land. Payments to be made half down and the balance in one or two years, with eight per cent interest on deferred payments. These lands have been passed upon by the Washington Horticulturist as being as high grade apple land as there is in the state. For descriptive article see another page of this edition.

If Interested Write to

T. Ernest Oates

or

Geo. J. Hurley

561 East Ankeny Street, Portland, Oregon

Loomis, Washington

APPLES

PLUMS

PEARS

PEACHES

PRUNES

JONATHAN'S NEWTOWN'S



A Promise of Good Returns

The Land of Opportunity

LOCATED across the Columbia River from Hood River, Oregon, the White Salmon Valley offers the greatest opportunities of any land on earth to fruit growers. Where apples, cherries, pears, peaches, prunes and strawberries grow to perfection. A few dollars invested in fruit land today will return to you in a very few years sixty-fold. The soil, climate, water and scenery are unsurpassed by that of any country. Build a home where you can enjoy peace and plenty the remainder of your life.

We have some bargains in orchard and general farm lands in and near White Salmon, also large and small bodies of timber land, cheap.

WRITE US FOR DESCRIPTIVE MATTER AND PRICES

Estes Realty & Investment Co.

White Salmon, Washington

SPITZENBERG'S WINESAPS

BERRIES

CHERRIES

STRAWBERRIES

NUTS

SIN-LA-HE-KIN VALLEY—Is located in the northern portion of Okanogan County, Washington, being ten to twenty miles south of the International boundary line. The elevation is 1,200 to 1,700 feet; the valley lying north and south, and the creek runs toward the north, emptying into Palmer Lake. Owing to our low altitude and the formation of the surrounding hills, there is about the same amount of snowfall here as at Kennewick, and in three years' time stages have used sleighs but five trips. We have from 250 to 300 days of sunshine every year, the highest temperature in 1910 being 95 degrees, and we have no hot nights, the evenings always cooling off as soon as the sun goes down. Our soil is of volcanic ash and decomposed granite, carrying a large amount of iron, and enriched by a heavy layer of leaf mould. There is ample water for the complete irrigation of the entire valley, supplied by three fine streams, all of which are well stocked with trout, as are also the surrounding lakes. A million acres of national forest reserve on both the east and west sides of the valley furnish the finest game preserve in the United States, in which are big horns, mountain goat, deer and caribou and all the wild animals, such as bear, cougar and the lesser varieties; grouse, pheasants, prairie chickens and quail are being protected, and are increasing each year.

These lands are midway between the railway and the county seat, and near the town of Loomis, and have daily mail service and rural delivery by stage every day. Orchards have been in continuous bearing here for the past twenty years, and all the highest grade apples, including Delicious, Spitzenberg, Winesap, Jonathan, Newtown Pippin, Pearmain, etc., grow to their greatest perfection, and are as highly colored and finely flavored as can be grown anywhere in the world. Pears, prunes, peaches, apricots and grapes also grow well and produce sure and abundant crops, and all vegetables, including tomatoes, sweet potatoes, peanuts, melons, etc., are sure producers. Ripe tomatoes were still hanging on the vines October 30, 1910. An electric road is already surveyed through the valley, and will be constructed in the near future. Our present railway shipping point is ten to fifteen miles distant, and it costs ten

ROGUE RIVER VALLEY

201 Acres, 5 miles from depot

A BARGAIN

Rogue River Frontage

At less than \$150 per acre all around, including equipment complete; 25 acres in orchards, part full bearing; location ideal; water and water rights exceptional; very best of soil for pears, apples, peaches, cherries, Tokay grapes, alfalfa. Address

OWNER, Box 23, care Better Fruit

cents per box to place our apples aboard the cars. The bottom lands grow fine timothy hay, and red top and alfalfa produce three fine crops each year; and the town of Loomis sends out more fine beef cattle each year than any other town in the state, the forest reserves furnishing fine range for five thousand cattle and one hundred thousand sheep.

The owners of 3,000 acres of the above lands purchased same direct from the United States government (no better title exists on earth), and in order to handle same have incorporated the Okanogan Fruit Lands, Irrigation and Power Co., with T. Ernest Oates president, Geo. J. Hurley vice-president and manager, W. A. Patterson secretary and treasurer, who, with J. M. Williams and H. N. Aldrich, are the trustees. This company is developing, exploiting and selling a portion of the land in this beautiful valley at a very low figure for land of this character in order to do further development work, and a letter to T. Ernest Oates, Portland, Oregon, or Geo. J. Hurley, Loomis, Washington, will bring further information to those interested.—Contributed.

FOR SALE

Choice ten-acre tracts Okanogan fruit land. First-class upper bench, near government canal; 1,280 feet altitude. Well water in gravel, thirty feet, pure. Planted to yearling apple trees; best red winter commercial varieties; also tracts not planted. Ready to irrigate. Great Northern Railroad now building in Okanogan Valley. Prices and terms right.

W. E. KIRKPATRICK

Epley, Wash. Okanogan County

Live facts in a lively way. Live facts for men and women. Facts that affect you—your family

HOOD RIVER VALLEY APPLE LANDS

Are paying from \$400 to \$1,000 an acre to their owners. Many started in a small way; today they are independent. You can begin today. It pays to see us

*He who investigates for himself becomes
"the man who knows"*

W. J. BAKER & CO.

Hood River, Oregon

We Raise the Big Red Apples

I have land for sale in the beautiful Mosier Hills, just six miles east of the town of Hood River, Oregon.

I have the exclusive sale of the East Hood River Land Company's lands.

Some choice tracts in one to three-year-old orchard.

I have had fifteen years' experience in the Mosier district and I have on my list the best buys in this district.

GEO. CHAMBERLAIN

Mosier, Oregon



SINLAHEKIN VALLEY, NORTH CENTER, LOOKING NORTH

BUILDING WINDBREAKS TO PROTECT ORCHARDS

BY J. L. ROBERTS, HOOD RIVER, OREGON

THE necessity for windbreaks is a subject which requires thought.

With the removal of our forests for orchard land, winds, formerly broken by these forests, now find themselves unchecked, and they rush across these orchards, doing much damage. This damage consists in moisture evaporation, in misshaping young and breaking heavily laden fruit trees; by increasing wind-falls; by producing mechanical injury, which makes the fruit unmarketable; by transporting loose surface soil; by making the orchard colder, and labor, such as pruning and spraying, more expensive. Hence, if we can break or check these winds we prevent much of this damage.

The windbreak has long been considered as a correction for these evils. Not only will it overcome the above-mentioned difficulties, but it may also protect the blossoms, preventing them blowing away with the wind—and acts as an ornament.

Claims are often made that windbreaks do more damage than good in that they rob fruit trees set near them of moisture and food. This is to some extent true. Trees set near a full-grown break, or well established, make poor growth. Yet when planted with or before the planting of the windbreak, poor results will seldom occur.

The kind of windbreak depends to a large extent on the location and lay of the land and the prevailing heavy winds. Winds blowing from large bodies of water are usually warmer than those blowing off the land. Thus, for the former case, we would plant a break merely to dissipate the force of the wind; while for the latter a close growing break, impenetrable to the wind, would be desirable. This rule will not always hold, for the lay of the land must be considered. If a close-growing break of the conifer type were set on a level piece of land, frosts would probably occur more

frequently than if a deciduous break were used. However, in the Northwest the majority of the fruit countries are situated near large rivers and bodies of water, whence come the prevailing winds. Thus the deciduous tree will as a rule be found more satisfactory than the conifer.

Among the deciduous trees valuable as windbreaks are the Lombardy poplar, the willow, alder and native quick-growing deciduous trees of the poplar type. Of these the Lombardy poplar is generally preferable. It is a hardy, upright, dense, quick-growing tree, which, if properly planted and trained, will make a dense break during the growing season and will weaken the force of the winter winds. It has proven a great aid to the fruit growers of Hood River, and should find a more general use throughout the Northwest.

Some growers modify the above-mentioned types of windbreaks by planting fruit trees closer than the usual planting distances. They allow these to grow together and never prune them. While they only half perform their duty as a break, they do lessen the force of the wind and at the same time produce some fruit, which, however, is usually of an inferior quality. Another objection to this fruit break is that they require as much spraying as any fruit tree, and the fruit they bear hardly pays for spraying. Having selected one's variety of tree

RICHARDSON Orchard Heater

Burns Perfectly crude oil, fuel oil, distillate oil or heavy residuum.

Never Fails to Burn during high winds or snow storms.

Economical Consumption of Oil, regulated according to the temperature to be controlled. Simple and effective.

The Hot Burner keeps up a continuous combustion as the oil drops, and with the oxygen of the air rushing to the burner, consumes everything and makes the greatest amount of heat and smoke possible.

Large Oil Reservoir, independent of burner, will give a season's oil supply. Always ready. Very important to have each Heater ready for duty.

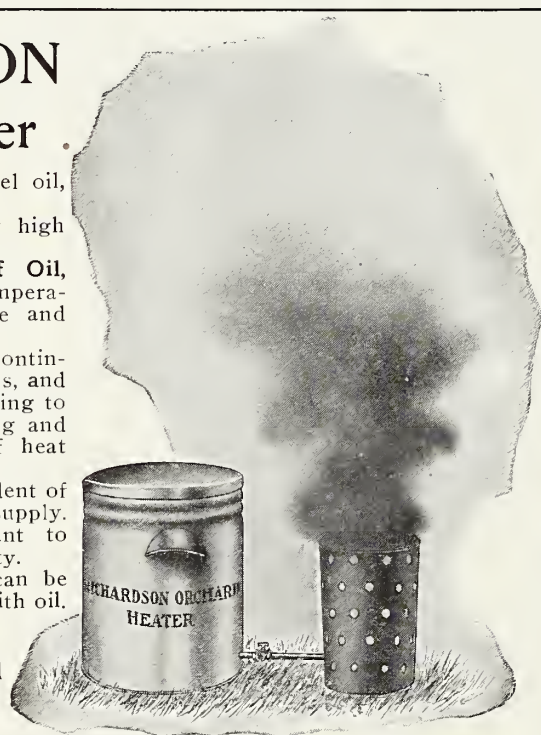
Emergency—Coal or wood can be burned alone or in connection with oil.

(Patent pending)

Geo. C. Richardson

1200 East Eleventh Street

KANSAS CITY, MISSOURI

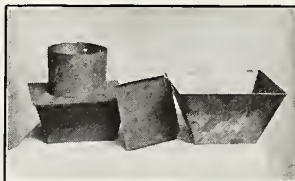


Buy Your Orchard Heaters Now

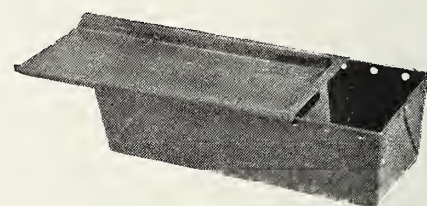
Everybody will want orchard heaters next spring; it has been demonstrated that orchard heating is profitable, and while heaters may not be needed next spring, it is well to be prepared for any emergency.

The National Orchard Heaters have been tested and have made good. Our sales are very great among those who have seen the heaters in operation. We know we will be swamped with orders in late winter and early spring, and therefore make special inducements for you to order now. Write us at once about your orchard, and we will tell you how many heaters you will need and the cost of same. Don't wait until you need the heaters—it will be too late then. Write now, and save money by ordering early.

National Orchard Heater Co., Grand Junction, Colorado



The Hamilton Reservoir Orchard Heater



Acknowledged and proven, after three years' most successful use, the standard of efficiency and the KING of all heaters.

Millions of dollars' worth of fruit saved from spring frosts by its use.

Most wonderful invention of the age, and the fruit grower and vegetable producer reap the benefits.

The "Draw the cover and regulate the fire" principle has won, and we offer you the very best your money can buy, with absolute protection to your crops. A quarter of a million heaters in the hands of inexperienced growers last spring has proven every claim we have made. Get in line with other progressive growers and protect your crops from frost. Write us today for full information and for the story of "Frost Fighting," which will interest you.

The Hamilton Reservoir Orchard Heater Co.

Grand Junction, Colorado



Absolute Protection in this Orchard by The Bolton System of Frost Prevention

The Bolton Orchard Heater was the first successful heater on the market and is the only one constructed on strictly scientific principles. No soot to injure your trees. Quickly started in emergencies. Burns eight hours. Guaranteed for five years. Cost \$2.00 an acre for fuel.

Price 20 cents Each

The Frost Prevention Company, Balboa Building, San Francisco, California

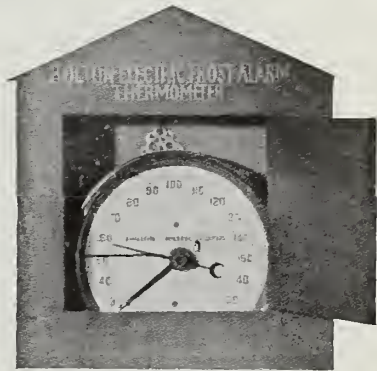
GET OUR FULL CROP PROPOSITION

This is the heater that first saved the crops in Colorado. We defy a denial. All growers that now have the Fresno or Bolton Heater will be supplied with the new attachment for 2½ cents each. This new device gathers all the SOOT and makes the heater burn eight hours on one gallon of oil.

The Frost Prevention Co.

BALBOA BUILDING

SAN FRANCISCO, CALIFORNIA



for the windbreak, the next step to be considered is the securing of the stock to plant. If one desires a fruit break the stock may be obtained from the nursery. However, if the non-fruiting break is preferred one must obtain cuttings from a neighbor possessing such a break, or through special order from the nursery. Cuttings should be made from one-year-old wood, about ten inches long, and possessing two buds. These cuttings will give better results if cut in the fall and kept dormant until spring. After cutting tie them up in small bundles and bury them in dry sand or sawdust in a dry, cool cellar or room where an even temperature can be maintained. This storing may be neglected and the cuttings may be planted as soon

as they are cut, either in fall or spring, if one is willing to chance a poorer stand. Whether stored or not, the soil in which they are eventually planted should be in the finest possible tilth. Plant them by inserting the lower end of the cutting, as it grew on the parent tree, in the soil, leaving only the top bud above ground. Lombardy poplar cuttings should be set twenty inches apart in the row. Others, such as the willows and alders, should be set at a distance sufficiently close to make a close break.

If possible, run your irrigation flume or ditch beside the break, for this insures a rapid growth and protection against too great a spreading of the roots. The windbreak will require, perhaps, one or two irrigations during the year. It will

show this requirement by a yellowing of the foliage.

After the break is set, subsequent care will consist in an occasional cultivation and hoeing to keep it clean, one good irrigation at least and a clearing or pruning for the first few years' growth. If the pruning of the Lombardy poplar is neglected the trees will grow up into slender poles. This yearly pruning insures a stocky, close-growing break.

BARGAIN

Half my 104 acres apple, pear and grape land. Irrigation unnecessary. Exposure and climate just right. WM. A. SUSSMILCH, Owner, Roseburg, Oregon

THE HEATER THAT MAKES GRAND VALLEY FAMOUS

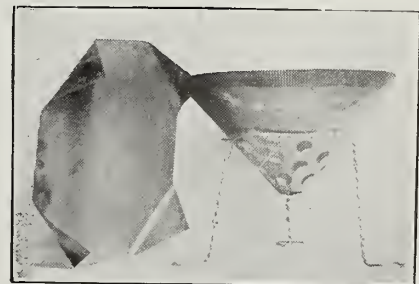
Millions of dollars worth of fruit has been saved by Ideal Coal Heaters. Big crops were saved when the temperature fell as low as 16 above zero in blooming time. Sixty-five thousand Ideal Coal Heaters were used in Grand Valley alone. Many thousands are sold for spring delivery. Our Jumbo Ideal burns all night without refilling. Ideals are reservoir coal heaters, self-feeding and self-cleaning. You pay for Ideals no matter what heater you use. If you use none you pay for Ideals many times. Better use them. We have sold many of our old customers heaters this year.

QUICK HEAT GREAT VOLUME
GREAT OUTWARD RADIATION BIG CROPS SAVED
VERY SMALL EXPENSE

Send 50 cents for sample. Reliable agents wanted. Write today.

The Ideal Orchard Heater Co.

Grand Junction, Colorado



The Hardie Triplex



From Maine to Washington, the Hardie Triplex Sprayer is working successfully. Our model for 1911, shown in the cut above, gives you an idea of the completeness of this machine.

Small details, which tend to perfect it in usefulness and completeness, are carefully looked after.

We give you a machine ready to run every minute you need it, doing efficient work for you all the time, and with

Nothing to Watch but the Spray

Light in weight, compactly built, efficient in every way, don't buy till you see the HARDIE TRIPLEX.

Our new catalog is now ready, showing over twenty different styles of hand and power spraying machines, nozzles, hose, etc.

Last spring when looking for a sprayer we looked at all the sprayers on the market and decided on the Hardie as being the machine suitable for our work. Before buying we were told by some that the brass cylinders on the Hardie pump would not last and would be soon eaten up by the action of the spray material. After a season's use we can say that the cylinders are as good as when the machine was taken out. The machine has been exceedingly satisfactory in every respect and has done all you claimed for it. You may use our names as reference at any time.

Wenatchee, Washington.

P. J. Morris.
J. R. Phipps.

The Hardie Triplex Sprayer I purchased this spring has given the best of satisfaction and I do not hesitate in recommending it to every one as the best power sprayer on the market. On account of its low build and light weight it can be taken into orchards where no other power sprayer would go without tearing the trees and knocking off the fruit. I have not paid out one cent for repairs this year.

Dr. H. J. Whitney.

Cashmere, Washington.

Send for Our Catalog Today

The Hardie Manufacturing Company

Hudson, Michigan

49 Front Street, Portland, Oregon

Will
You
Send
for the
New
1911
Bean
Catalog
?

A Valuable Book!

It Ought to be in the Hands of Every Fruit Grower

It tells the story of the wonderful Bean line—illustrates and describes all Bean power outfits, Bean hand pumps, Bean accessories and spray materials. The book is free. Use the coupon below.

Bean Power Outfits

The Bean Giant No. 120 or 124 for the large size orchards. It has a capacity of from 7 to 10 gallons a minute and is tested for 240 pounds pressure.

The Bean Challenge for medium size orchards. A thoroughly good outfit, with a capacity of 6 gallons a minute; it will supply two large nozzles at high pressure.

The Bean Pony No. 140 for small size orchards. A high grade outfit through and through. It will supply two of our large Jumbo nozzles, and do it with ease.

When you purchase any of these outfits you purchase absolute satisfaction with it. There are

**NO TEMPER-TESTING, TIME-CONSUMING,
MONEY-WASTING REPAIRS TO MAKE**

In the first place, all Bean parts are as near "wear proof" as it is possible to make them. In the second place, whenever a part does wear out you can replace it in a few minutes without the help of a skilled mechanic.

All parts are made in duplicate. At any time you can order new parts from our catalogue and be absolutely sure that they will fit exactly. As an example of the ease with which the parts can be reached we call your attention to the Bean Patent Bell Metal Ball Valves. The valve parts are held in position by a small set screw—there are **now no threads in the Bean Valve**. Consequently the spraying material cannot corrode the valve or cause any trouble whatever.

Bean power outfits are very easy to handle. They set low down and are built for short turns.

The steel platform makes them perfectly rigid—they can't break or warp.

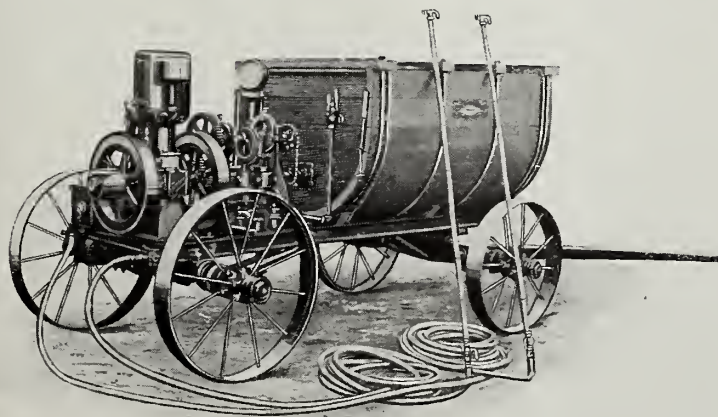
Our new catalogue goes into details, tells just how the various Bean outfits are built, describes the different patented features and shows you beyond any room for doubt that the Bean power outfits are unquestionably the most efficient and perfect on the market.

Send for the the catalogue and satisfy yourself.

Bean Spray Pump Co.

Cleveland, Ohio

213 W. Julian Street, San Jose, California



THIS IS THE BEAN GIANT NO. 124

Bean Spray Pump Co.,

San Jose, California.

Gentlemen—Send your 1911 catalogue to the following address:

Name.....

Address.....

A GROWER'S OPINION ON PLANTING FRUIT TREES

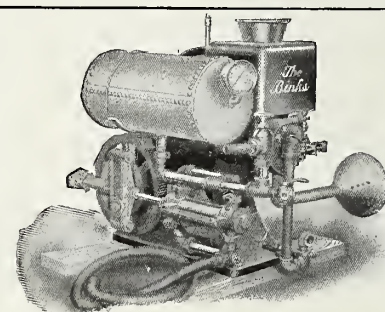
BY S. M. LAMBLIN, HOOD RIVER, OREGON

AS the season is at hand for tree planting I ask permission to make a few statements in regard to the planting of fruit trees. First, buy your nursery stock of a home grower that has a good reputation as an honest man. Beware of the smooth, far-away tree peddler that has no interest in you or your country only to get your money. Buy the best stock you can get, and the variety best adapted to your locality. Whole root apple trees are the best; they have a more natural foundation and perfect system of roots. When your land is properly prepared and you are ready to plant, notice that the tree has a good strong system of roots, not infected with root disease, root knots

or crown gall, then prune roots back; cut from under side so the cuts will set squarely on bottom of hole; set tree in hole straight; dig hole of good size, putting top soil in one pile and balance in another pile; put tree in hole; cover roots well with top soil, then firm well with the feet, then fill balance of hole. but do not firm ground about the tree with the feet after the hole is filled. Land should be in good condition at time of planting and not too wet. After tree is planted it should not be more than two inches deeper than it stood in the nursery. After your trees are planted, if they are well supplied with limbs, cut all surplus limbs. The lowest limb should be about twenty inches from

the ground, as a low-top tree is more desirable. If you are planting one-year-old trees that have no limbs do not cut back too low, as the limbs will be too much in a cluster, and your tree in time will be broken down, as the stain of the limbs will be too much in one place. Cut

HEADQUARTERS FOR
**CENTURY
SPRAY PUMPS**
Hose, Nozzles, First-
class Plumbing Supplies
C. F. SUMNER
Successor to Norton & Smith
HOOD RIVER, OREGON

**Binks Sprayers are Good Sprayers**

Light, Compact, Simple and Durable
Illustrated Catalogue free for the asking

PARKER & FISH
Union Block, Seattle
Pacific Coast Distributors for
Binks Spraying Machine Co.

OWN YOUR OWN IRRIGATION SYSTEM

CONVERT that creek, slough, pond, or other source of water supply that you think is worthless into a valuable asset—make it irrigate your entire farm.

You can have a dependable irrigation system of your own which will free you from the worries of uncertain rainfall and make you entirely independent of irrigating companies.

You know it is not so much the scarcity of water as the getting it from the place where it is not needed to the place where it is valuable.

An I H C gasoline engine will solve this problem for you by pumping the water economically and unfailingly. You can start the engine at any time and irrigate the crops whenever they need water—thus you are made master of the situation.

I H C Gasoline Engines

require very little attention and will pump water in large quantities economically and unfailingly. An I H C gasoline engine will not only serve as the basis for your irrigating system but it will run your fanning mill, feed cutter, grindstone, bonecutter, churn, washing machine, and all similar machines.

I H C gasoline engines are made in the following styles and sizes:

Vertical—2, 3, 25, and 35-horse power.

Horizontal—(portable and stationary) 1, 2½, 4, 6, 8, 10, 12, 15, 20, and 25-horse power.

Tractors—12, 15, and 20-horse power.

Air Cooled—1, 2, and 3-horse power.

Sawing and spraying outfits.

For detailed information concerning the one best suited for your individual use please call on the I H C local dealer or write to our nearest branch house.

WESTERN BRANCH HOUSES: Denver, Col.; Portland, Ore.; Salt Lake City, Utah; Helena, Mont.; Spokane, Wash.; San Francisco, Cal.

**INTERNATIONAL HARVESTER
COMPANY OF AMERICA**
(Incorporated)

**CHICAGO
U S A**

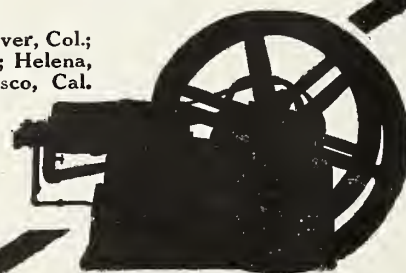
I H C Service Bureau

What is it? A clearing house of agricultural data.

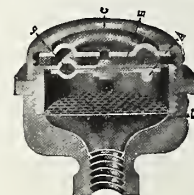
What does it do? Helps farmers to help themselves.

How can it be used? By sending your farm problems and puzzling questions to the Bureau.

We are co-operating with the highest agricultural authorities and every source of information will be made available to solve your difficulties. We shall be pleased to have an opportunity to assist you. Write the I H C Service Bureau.



Get to the
Very Center
of the
Blossom with
the great



Non-Clog Atomic Nozzle

The great Non-Clog Atomic Nozzle is a perfectly simple, simply perfect nozzle which will not—cannot clog. A test was made by spraying a solution of sawdust.

It is instantly adjustable, even when working, from a mistlike, narrow or wide angle spray to a concentrated stream. This feature makes it the ideal nozzle for orchard or field work. It will throw the solution to the top-most branches of the tree or gently sprays it over the most tender vine.

When used in connection with a 45 degree elbow, the Non-Clog Atomic throws the solution squarely into the center of every blossom—applying it into the calyx—the only successful way to combat the codling moth. It is fitted with four removable discs which give a capacity of 1—2—3 or 4 point Vermorels. It is cast bronze. The discs are galvanized steel or brass as preferred. It has no projections to catch on limbs. We are the largest

Hand and Power Spraying Machine

manufacturers in the world. Practically all Government and State Experiment Stations endorse Brown's Auto-Sprays. More than 300,000 in use.

Send for book of 40 styles and sizes of Hand and Traction Power Auto-Sprays. This book contains an article on spraying by Prof. M.V. Slingerland of Cornell University of Agriculture and shows you the right machine for your purpose at the right price.

The E. C. Brown Co., Rochester, N.Y.
Pacific Coast Trade Supplied by
Chas. H. Lilly Company, Seattle, Wash.

Deming Sprayers for 1911

The list of Deming Machines for 1911 includes outfits adapted to the work of every grower. They are suited to large orchards or small, smooth ground or hilly, high altitudes, where the atmospheric pressure is light, and the valleys, where conditions are normal. They are indeed the outfits for **every** condition and user.

We illustrate a couple of the best sprayers for large growers—others will be described later.

GET THE "BORDEAUX" AND "DEMOREL" NOZZLES FOR YOUR WORK THIS YEAR

Deming Nozzles, like Deming Pumps, are made to render the greatest service to the grower—they are found wherever good spraying is done. They are made in seven styles, each of which has its advantages.

The best of all are the "Bordeaux," the "Demorel" and the "Simplex." Every Deming Nozzle, like every Deming Spray Pump, is carefully tested before it leaves the factory.

Catalogue and full particulars from the nearest Deming dealer

Your hardware or implement dealer probably handles Deming Spray Pumps, or will secure full particulars and prices for you. If he does not carry the Deming line, drop us a postal and we will advise you, by return mail, where our outfits may be had, if we have an agency in your locality.

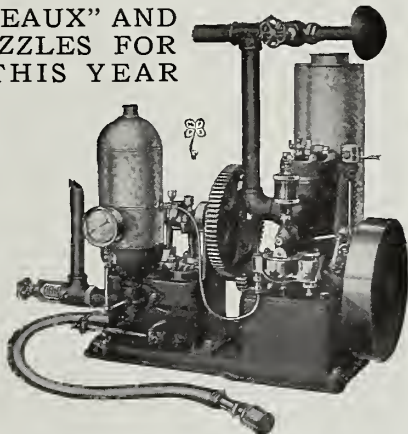
If we are not represented close by, we will forward Catalogue and full particulars, and quote prices for direct shipment. In any event, do not accept a substitute for the "Deming," but give us a chance to show you, as we gladly will, *why and how* Deming machines are better.

THE DEMING COMPANY

Manufacturers of Pumps for All Uses

870 Depot Street, Salem, Ohio

DISTRIBUTING AGENCIES IN PRINCIPAL CITIES



The Great Many-Purpose Irrigation Machine

It will cut your drainage ditches;
Stir your soil; Level your land;
Cut laterals; Cut your sage-brush;
Throw up dikes and grade roads;
Pick up dirt—carry it—and drop it where you want it.

20th Century Grader

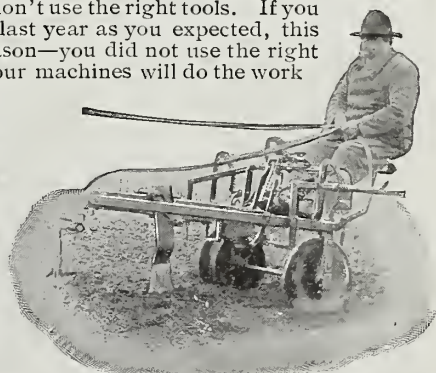
The Original One-Man Machine

The 20th Century weighs but 600 pounds. One man with two or four horses operates it. Turns in 10-foot circle. Does twice the work of the big, heavy grader with four horses with half the effort.

Mr. Fruit Grower—you can't expect big returns from your work if you don't use the right tools. If you did not do as well last year as you expected, this is probably the reason—you did not use the right tools. If one of your machines will do the work of several expensive ones it means bigger profits at the end of the year.

You shouldn't be without a 20th Century Grader on your place for it has a score of uses.

Let us tell you what others say of it. Send postal for detailed information about these wonderful machines.



THE BAKER MANUFACTURING CO., 542 Hunter Bldg., Chicago, Ill.

switch high enough so limbs will form up and down the tree so the lowest limb will be about twenty inches from the ground. Watch carefully the first summer, and when the young, tender sprouts are growing pluck off all but what you want for limbs in the future. By this treatment you will be surprised at the growth your trees will make the first season. As there are no surplus limbs to take up the vitality of the young tree, this system will avoid much pruning the next season. To grow an orchard it requires much care and attention. In

the first place, you should have a taste for that kind of work. If you have not the taste for that kind of work you should hire someone that has the experience and taste, but be careful who you hire. You cannot pay too much for the man who has had the experience and has good taste for that kind of work. The writer has had twenty-five years' experience in fruit-growing in different states. From what I have observed I believe the general condition for apple-growing is best in Hood River valley of any locality I have visited.

The older the meadow, the better the land. So if this is true, why not improve your land while growing the trees? But the objection is raised that you cannot get rid of it when you want to. If it is a good thing for the trees, why not keep it there? I planted my first orchard in the spring of 1885. I planted my present one in 1905. I seeded five acres of it to alfalfa this fall, and have a good stand. I intend to leave it permanently. I do not think red clover is good in an orchard, because it does not root deep and takes the moisture from the trees, while alfalfa has but one root, and grows deep in the ground. There is an old orchard at Monitor, Washington, that to my knowledge has been in alfalfa for fifteen years, and it has as healthy a look as the ones that have clean cultivation, and produces just as well. So why not alfalfa? Yours respectfully,

N. S. TITCHENAL.

COMMUNICATIONS OF INTEREST TO THE GROWER

Storrs, Connecticut, October 17, 1910.

Editor Better Fruit:

I wish to compliment you upon the excellence of your September number, dealing with the subject of fruit packing. I shall be able to use this publication to good advantage in many ways. I would appreciate a second copy if you have one to spare.

Yours very truly,

C. D. Jarvis, Horticulturist.

Omaha, Nebraska, October 11, 1910.

Editor Better Fruit:

Enclosed please find check for \$2.00 to pay my subscription to "Better Fruit" for two years. Your excellent paper would be cheap at \$3.00 a year—\$1.00 is too little.

Yours truly,

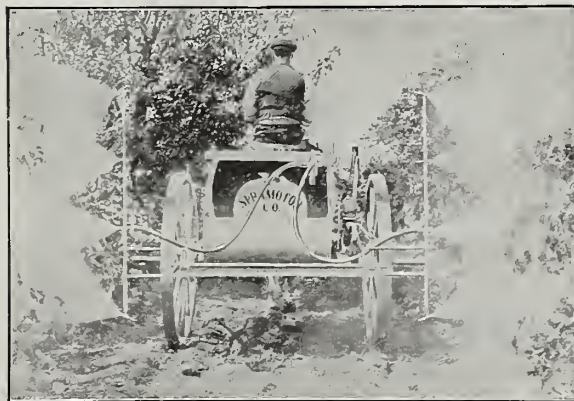
John Steel.

Cashmere, Wash., Oct. 10, 1910.

Mr. George W. R. Peaslee, Clarkston, Wash.

Dear Sir—As you have requested me to write you my opinion on the planting and care of an orchard, I will endeavor to make what I have to say plain, and my reason for saying it. I would plant thirty feet each way, only one variety in a row, the way you wish to run the water (my suggestions are for irrigated land only), and not more than two or three of the best winter varieties of apples. I would never plant fillers. I would use a grain drill and seed between the

rows the way the water should run the best, to within five feet of the trees to alfalfa. I would cut it for hay, which will pay all the expenses until the trees come into bearing. I think we are all agreed that alfalfa land is the best for trees.



HORSE POWER SPRAMOTOR

High pressure, 100 to 200 pounds; for one or two horses. Over 500 in use. Automatic regulator (no safety valve); nozzle protector; 12-gallon air tank, largest capacity. Can be hand operated. Nozzle controlled automatically, as to height, width and direction.

Also for orchard, melons, potatoes, etc. The largest line of spraying machines in the world. Guaranteed against all defects for one year. Particulars free—NOW.

This ad will not appear again in this paper.

R. H. HEARD

1334 Erie St., Buffalo, N. Y.

AMERICAN POMOLOGICAL SOCIETY CATALOGUE

BY REASON of the lapse of time (eight years or more) and the many changes that have naturally occurred in the rating of varieties and their behavior, in the many sections of the country, besides the numerous new and then untried varieties that have since been tested, makes a complete revision of the Catalogue of Recommended Fruits of primary importance. To this end your aid and assistance is earnestly solicited. The object sought is to be able to give to the fruit growers in every section of our great country as correct and reliable advice in the selection of varieties for planting as is possible to be furnished, and the Bureau of Plant Industry of the United States Department of Agriculture is lending its aid in support of the project in which we are engaged, and to which you are solicited to contribute. A copy of *Farmer's Bulletin No. 208*, with

map and outlines of the nineteen pomological districts into which the country is divided, and also list of varieties recommended for the various districts, with their ratings as given in the preceding catalogue, that was sent out from this office some eight years since, is herewith sent you.

Eight years since, is herewith sent you.

Carefully examine the map and catalogue, noting the number of the district in which you appear to belong. Your office, county and state or province (which give) will enable this office to determine your exact location in a district. Scan the list of varieties as published in the bulletin sent you and strike off or change the ratings of any that may not appeal to your better judgment, or as may not agree with your experience and observation, after which tear out that part of the bulletin so marked and return the same to this office in the accompanying franked

envelope, together with such further suggestions as you may see fit to make. In case you have had experience with varieties, not found in the list belonging to your district, that you wish to have added thereto, use the inclosed blank sheet, and in case the variety is new or local, make the tabular description as exact and complete as possible, not omitting to give in the column for remarks any item of history of the variety so

[illegible]

(Name) _____

(Distribution)

(Contd.)

(Stages)

recommended, as you may be in possession of. In suggesting new varieties for addition to the catalogue it should be borne in mind that only such as have been tested in more than one locality during several fruiting seasons are considered eligible for starting. Varieties found fairly successful should be designated by a single star (*), reserving the double star (**) for very successful varieties. Varieties that have not been fruited outside of their original localities may be added to the list as promising varieties, and should be marked with a dagger (†).

Unless persons to whom the circular is sent make complete report their district will not be fully represented in the bulletin. Correspondents are earnestly requested to complete their reports promptly and forward them to this office, using the franked envelope for this purpose.

Very respectfully,

G. B. BRACKETT,
Pomologist.

◆ ◆ ◆

BIG DEMAND FOR COLLEGE GRADUATES. That the demand for college trained men to fill positions of importance for the government, for educational institutions and for big agricultural enterprises is greater than can readily be supplied at present is proven by the number of vacancies which the Oregon Agricultural College has had to refuse men for, because those fitted for them were already placed. In the past two years many graduates have received appointments in government departments or elsewhere. One went to the University of Idaho as professor of horticulture; five more became assistants in experiment station work, including a horticultural instructor in the University of Maine, another in Washington State College and others in the Canadian Department of Agriculture, the Hermiston experiment station and that at Union, as well as expert for the United States Department of Agriculture in horticultural work. Seven are now orchard foremen, and a number more have obtained instructional appointments at their alma mater at Corvallis. A large majority of the graduates of the college have refused remunerative offers of the sort and instead have returned to the farm to apply in actual practice the knowledge gained in their studies.



Breakfast in a Warm Room

In very cold weather many dining-rooms would be "like ice-boxes" at breakfast time, before the house fires have started up, if it were not for the

PERFECTION

SMOKELESS
OIL HEATER

Absolutely smokeless and odorless

Lighted in a moment, and quickly giving a glowing heat, the Perfection Oil Heater has enabled many a man to go to business in a cheerful, confident spirit who otherwise might have felt and shown all day the effects of a cold, cheerless breakfast-room.

It has a cool handle and a damper top. An indicator shows the amount of oil in the font. It has an **automatic-locking flame spreader** which prevents the wick from being turned high enough to smoke, and is easy to remove and drop back so the wick can be cleaned in an instant. The burner body or gallery cannot become wedged, and can be easily unscrewed for rewicking. Finished in japan or nickel; strong, durable, well made; built for service, and yet light and ornamental.

Dealers Everywhere. If not at yours, write for descriptive circular to the nearest agency of the

Standard Oil Company

ORCHARDIST SUPPLY HOUSE

FRANZ
HARDWARE CO.

Hood River, Oregon

SOME MODERN METHODS OF MARKETING FRUIT

ADDRESS OF H. M. ELLIS, VICE PRESIDENT OF PIONEER FRUIT COMPANY, AT UTAH STATE HORTICULTURAL MEETING

IT IS now some forty years since the first shipment of deciduous fruit was made to the Eastern states, and many ups and downs have occurred during that time, making it necessary for the grower and shipper to make constant improvements in their methods of packing and marketing their product. Their experience demonstrates clearly that it is absolutely necessary to continue bettering conditions in order to take care of the enormous increase in the production of fruit, so as to bring about profitable results to all interested. At the commencement it was not known what varieties of fruits were going to be of the greatest commercial value, therefore, the

early shipments were merely an experiment, and it can be truly said that when the fruit was first planted it was not with the idea of shipping to Eastern points, as well as to foreign ports, but that it would be for purely local consumption. With the rapid increase in the production, it was found necessary to go away from home and find markets elsewhere to take care of the steadily increasing output. The Bartlett pear was the first variety of fruit that was ever sent to an Eastern market. It was packed in the crudest manner, without wrapping or any particular attention being given to protect the fruit. It was loaded in a common box car, and the car of that date was a very inferior affair as compared with the modern car of today. In order to insure the proper handling of this particular car, the shipper personally accompanied the shipment, so as to see that the fruit was properly cared for while in transit, as it took at that time approximately twenty days for a car to travel via freight train service to Chicago, and while the fruit did not arrive in perfect condition, on account of the novelty, it brought extraordinarily fancy prices, which encouraged the shipper, as well as others, to keep on making further shipments, and naturally created some excitement among growers, who immediately

commenced to increase the planting of trees, as they found there was likely to be a profitable market for the product which they were not aware of up to that time, demonstrating very clearly that the fruit industry, as well as the army, needed a leader. At that time there was no special rate made by the transportation companies on fruit, as we have today, nor did they give the expedited

"COUNTRY CLUB"

TO get a collar that looks **right**—not nearly right or fairly well, but **right**—is a great satisfaction to any man. Put "Country Club" on, and adjust your scarf—you'll get this satisfaction. It comes with

CORLISS-COON
HAND MADE **COLLARS**

2 for 25c

In Canada 20c; 3 for 50c.

"Country Club" and other Corliss-Coon hand-made Collars at the best shops

New Style Book on request

CORLISS, COON & CO.
Department V Troy, New York

The PARIS FAIR

Hood River's largest and best store

DRY GOODS
SHOES, CLOTHING

We are offering some extra specials in our Clothing Department. Ask to see them.

Try a pair of American Lady \$3 and \$3.50 Shoes, or American Gentleman \$3.50 and \$4 Shoes

THINGS WE ARE AGENTS FOR

KNOX HATS

ALFRED BENJAMIN & CO.'S CLOTHING

DR. JAEGER UNDERWEAR

DR. DEIMEL LINEN MESH UNDERWEAR

DENT'S and FOWNES' GLOVES

Buffum & Pendleton

311 Morrison St., Portland, Oregon

POULTRY AND FRUIT FARMING



"The Billion Dollar Hen!" Yes, that is where the chicken of today stands, and great fortunes are being made each year from a few hens and a small piece of ground. Read the "A B C and X Y Z in Poultry," beginning with next issue of

American Hen Magazine
Council Bluffs, Iowa

25 cents for a whole year. Descriptive circular free

STORAGE

Ship your Furniture to us
to be stored
until you are located

Transfer & Livery Co.

Hood River, Oregon

Cupid Flour

Has same standing in the Flour trade that Hood River Apples have in the Fruit trade.

MADE BY

HOOD RIVER
MILLING CO.

S. E. Bartmess

UNDERTAKER AND
LICENSED EMBALMER

For Oregon and Washington

Furniture, Rugs, Carpets
and Building Material

Hood River, Oregon

W. F. LARAWAY

DOCTOR OF OPHTHALMOLOGY

EYES
TESTED



LENSES
GROUND

Over 30 Years' Experience

Telescopes, Field Glasses

Magnifiers to examine scale

Hood River
Oregon

and

Glenwood
Iowa

Be An Independent Buyer

"A Kalamazoo
Direct to You"
TRADE MARK REGISTERED

"And Gas
Stoves, Too"



Oven Thermom-
eter Makes
Baking Easy

tomers in 21,000 towns. Over 400 styles and sizes to select from. \$100,000 bank bond guarantee. We *prepay* all freight and give you

—30 Days' Free Trial
—360 Days' Approval Test
—CASH OR CREDIT

Write a postal for our book today—any responsible person can have same credit as your home stores would give you—and you save \$5 to \$40 cash. No better stoves or ranges than the Kalamazoo could be made—at any price. Prove it, before we keep your money. Be an independent buyer. Send name for **Free Catalogue No. 574.** Kalamazoo Stove Company, Mfrs., Kalamazoo, Michigan

**Spend One Cent For
This Big FREE Book**

Our Big Free Stove and Range Book gives you our factory wholesale prices and explains all—saving you \$5 to \$40 on any famous Kalamazoo stove or range, including gas stoves. Sold only direct to homes. Over 140,000 satisfied customers.



service which we are enjoying at this time. Their rates were very high, and the service not in accord with what they were charging. The freight on the car referred to was more than \$1,200, and in those days freight had to be paid in advance, as the transportation companies did not consider a carload of fruit worth the transportation charges; while today, under our California organization, the railroad companies do not demand prepayment of charges, and sight draft, accompanied by the bill of lading, is

accepted by all banks at its face value. It was found that fruit shipped in ordinary box cars arrived at its destination in more or less over-ripe condition, and in order to overcome this condition it was found necessary to adopt some other method, and the refrigerator car was brought into service. At that time, however, transportation companies could only furnish cars that had been used for transporting meat from the East to California. With these cars they were then able to ship the fruit under ice,

causing it to arrive in better condition and bring better results.

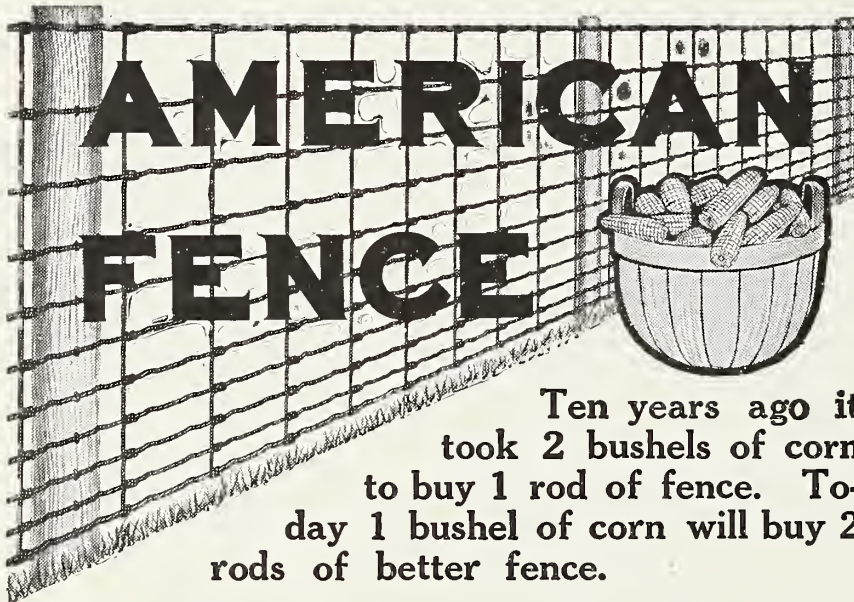
In those days, the only way they had of marketing their fruit was by consigning it to the various commission houses throughout the East, who would dispose of it, rendering any kind of return to the shipper that they saw fit, we being unable to make any kind of check as to its condition, being compelled to accept whatever the commission merchant saw fit to give us.

At that time, also, we had another serious difficulty to contend with, which was the lack of confidence between the shippers, who could not be brought together to work for one common interest. Fruit was competing against itself; some markets were glutted, others had none; demoralization existed everywhere. As new acreage was constantly coming into bearing and shipments increasing, it was realized that it was necessary to bring about a material change in the method of marketing the immense tonnage and that a better feeling should exist among shippers, so as to bring about some uniform method that would enable the fruit to be marketed at a profit to those interested.

Today, conditions have improved, and we have been able to establish a more friendly feeling between growers and shippers, which has resulted in building up the industry by improvements in marketing, expedited service, and transportation charges. This was brought about by considerable effort on the part of the shippers by the organization of a fruit distributing agency, through which the major portion of the fruit is marketed, and it in turn has gained the confidence of the growers and is using its best efforts to improve all branches of the industry.

Today, our fruit is packed in a more

Higher Cost of Living Does not Include Fence



Ten years ago it took 2 bushels of corn to buy 1 rod of fence. Today 1 bushel of corn will buy 2 rods of better fence.

Price Low—Quality Better Than Ever

Within ten years farm products have greatly advanced in market value while the price of woven wire fence has been reduced. These are the reasons: Newer and improved methods of digging the ore, shipping to the furnaces, melting into steel and making into finished products are in force. Ten years ago operations were on a small scale. Today the plan of operation is vast. The manufacturer is able to deliver the finished goods quickly, of better quality and at a lower price.

American fence is made better than ever. It is a thoroughly galvanized square mesh fence of weight, strength and durability. Large wires are used and the whole fabric is woven together with the American hinged joint (patented)—the most substantial and flexible union possible. Both wires are positively locked and firmly held against side slip and yet are free to act like a hinge in yielding to pressure, returning quickly to place without bending or injuring the metal.

Dealers Everywhere Stocks of American Fence are carried in every place where farm supplies are sold. The Fence is shipped to these points in carload lots, thereby securing the cheapest transportation, and the saving in freight thus made enables it to be sold at the lowest prices. Look for the American Fence dealer and get the substantial advantages he is enabled to offer. He is there to serve the purchaser in person, offer the variety of selection and save the buyer money in many ways.

FRANK BAACKES, Vice-President and General Sales Agent

American Steel & Wire Company

Chicago

New York

Denver

San Francisco

Send for copy of "American Fence News," profusely illustrated, devoted to the interests of farmers and showing how fence may be employed to enhance the earning power of a farm. Furnished free upon application.

ARE YOU INTERESTED IN BEE KEEPING, POULTRY AND GENERAL FARMING?

No section of the United States offers better opportunities for those interested in the subjects mentioned than the West. The supply does not begin to equal the demand. Prices are good, profits exceptional. If you want to know more about the opportunities in the West and Northwest, use the coupon.

The Pacific Monthly Company,
Portland, Oregon.

Enclosed find 25 cents. Please send three recent numbers telling about bee keeping, poultry raising, etc.

Name.....

BF Address.....

THROUGH THE SOUTH SEAS WITH JACK LONDON

Jack London saw many strange sights in his year's cruise on the "Snark." Not all of us will have the opportunity of making such a voyage, but we can enjoy the enchantment and novelty of such a trip through the descriptions of such an artist as London. The series of travel sketches is running now. Send this coupon and get started right.

The Pacific Monthly Company,
Portland, Oregon.

Enclosed is 25 cents. Send three recent issues containing Jack London's South Sea articles.

Name.....

BF Address.....



"SAVE-TIME" FOLDING BERRY BOX

KNOW THEM IN TIME
AND SAVE YOURSELF, YOUR TIME AND YOUR MONEY
THERE IS NO POINT OF QUALITY LACKING

Manufactured by

Pacific Fruit Package Co.

H. B. HEWITT, Pres. and Treas. J. H. HEWITT, Vice Pres. O. C. FENLASON, Sec. and Mgr.
Raymond, Washington

Agents Portland, Oregon, Territory:

STANDARD BOX & LUMBER CO.
East Pine and Water Sts., Portland, Oregon

Agents Spokane Territory:

WASHINGTON MILL COMPANY
Spokane, Washington

careful and businesslike manner, care being taken to prevent bruising, it being packed in boxes of a standard size. This package was expressly made not only for the proper packing of the fruit, but to meet the requirements of the Eastern trade and be acceptable to them. The fruit is graded according to size and quality, and the boxes are plainly marked with the grower's name, or brand, and variety. Our experience has demonstrated that it is far better to use this method of marking instead of using numbers or letters, as it gives the Eastern buyer an opportunity of becoming acquainted with the name or brand, so that he can base his buying and selling prices accordingly, for the buyer recognizes the brands of growers who are regular shippers, and in many instances is better acquainted with the quality and pack than we at this end, and knows whose pack is either up to or below the standard. A good pack very soon finds favor with the buyer, resulting in better prices.

The loading of cars is not a thing that should be passed over lightly, as it has an important bearing on getting the fruit into market in good condition. Cars should be loaded by experienced car loaders, who understand the method of loading by tiers and spacing the fruit so as to insure a proper circulation of

DAVIS SAFE & LOCK CO.

Factory, Kenton, Oregon (suburb of Portland)

Salesroom, 66 Third Street, Portland, Oregon

AGENTS FOR

DIEBOLD SAFE AND LOCK COMPANY
BERGER METAL VAULT FURNITURE
NORTON AND BUCKEYE JACKS

**FIRE AND BURGLAR PROOF
SAFES AND VAULTS
JAIL CELLS**

SAFES REPAIRED AND EXCHANGED

SAFE AND TIME LOCK EXPERTS

cold air around the boxes. The car loader's experience enables him to properly tier the fruit so that it will come out even without over-loading or loading too high, yet carrying the necessary minimum carload weight. Strips of wood are used to relieve the weight of the fruit from pressing on the lower packages, and to insure a good circulation, as well as to prevent the load from shifting. In addition to stripping, cars should be properly braced, just as evenly and securely as is possible, as we all know a car on a long journey in the heavy freight trains receives very rough handling, and

D. McDONALD

Hood River, Oregon

Headquarters for

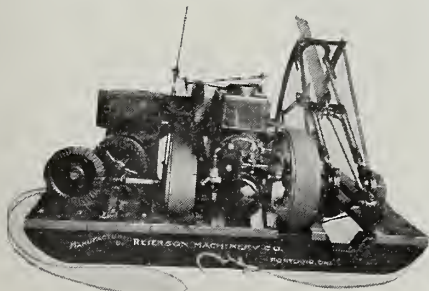
FARMING AND ORCHARD

TOOLS

Disc Harrow Extension for
Orchard Cultivation a Specialty

When you want any kind of Orchard
Tools come to me and get the **Best**

KING OF THE WOODS



45 CORDS SAWED
IN ONE DAY

POWER DRAG SAW

Saves money and backache. Weighs only 1,600 pounds, with 4-horsepower Waterloo engine, water-cooled. Can be operated by one man. Pulls itself forward and backward, up hill or down hill; lots of power and some to spare. Uses only 4 gallons distillate per day, which costs 8½ cents per gallon. Get our descriptive catalogue and prices.

Reiersen Machinery Company
PORTLAND, OREGON

WATCH THIS
SPACE FOR
CUT OF OUR
IMPROVED
POWER SPRAYER

WRITE
FOR
PRICES

unless it is securely braced the breakage will be unusually heavy. Proper bracing is an important factor in the transportation of all fruit.

The refrigerator car of today which is built for the transportation of fruit, is built on scientific plans, and has a much larger ice capacity than those used in earlier days. Many of the cars now have tanks capable of holding five and six tons, which is replenished along the route at regular icing stations, established at short intervals, so that the cars are re-iced about every twenty-four or thirty hours.

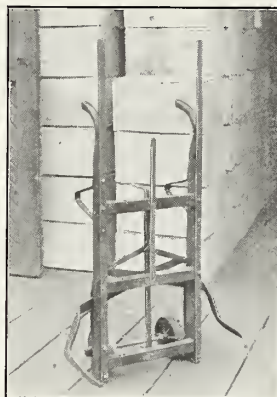
The establishment of the various fruit express companies who operate this class of equipment has aided materially in improving transportation facilities. With the inauguration of the new method, "the pre-cooling process," it means far more to the horticultural interests than we have any idea of at this writing. While these pre-cooling plants are being located at certain points, it is only a matter of a short time when plants of this character will be established at every loading station. The pre-cooling of deciduous fruit before it starts on its journey is the secret of proper transportation, and when these plants can be established at a reasonable figure, and within the means of shippers and growers, we will not have the many complaints that we are getting today of the fruit arriving in a decayed condition, or over-ripe. Success in pre-cooling should mean to us a reduction in the present refrigeration charges. The California lines have

recognized the importance of pre-cooling deciduous fruits, and have recently erected two plants in California at a cost of \$500,000 each.

The question of service has a very important bearing on the condition in which fruit arrives in the markets, and undoubtedly the transportation companies appreciate that fact, realizing that the better the service the greater will be their tonnage and revenue. They have, therefore, inaugurated a system for the handling of fruit trains which enables them to keep in daily touch with the movement. This system is so perfect that they can tell you within a few hours the location of any car containing fruit moving over their rails. We are enjoying regular and dependable service, so that our fruit is sold in Chicago on the morning of the eighth day, in New York

the morning of the eleventh day, and in Boston the morning of the twelfth day. Other Eastern points enjoy correspondingly the same service. Think what that means, compared with the service given only a few years back, when it was very irregular and ind dependable, so that we could not arrange our shipments that they would reach any particular market on a certain day. Today, however, it is just the reverse, and we still have hopes of further improvements,

HARVEY BOLSTER SPRINGS



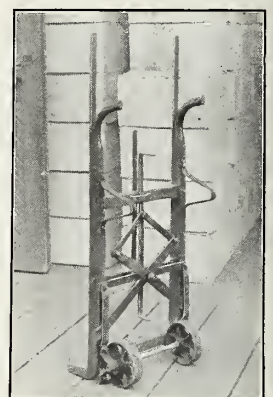
The PERFECTION CLAMP TRUCK

Patented 1910 in U. S. and Canada

Saves labor, jar and breakage. Indispensable to fruit dealers and growers. Write for circular giving descriptive details and prices f.o.b. Seattle, Portland and Vancouver, B. C.

Manufactured by

SAMSON & ARCHIBALD
Vernon, B. C., Canada



SCOTT-MUNSELL IMPLEMENT CO.

321-329 East Morrison Street, Portland, Oregon

1018-1020 Sprague Avenue, Spokane, Washington

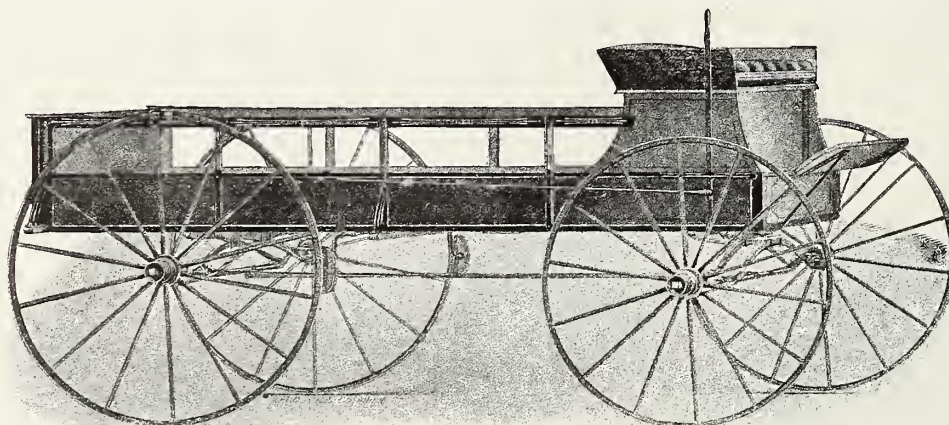
WHOLESALE AND RETAIL DEALERS IN

Vehicles and Implements

Carry large assortment of best styles of earth-working tools; also haying and harvesting machinery; also wagons for fruit delivery and for teaming; also driving vehicles for business and for pleasure uses.

WE RECOMMEND TO FRUIT GROWERS THIS WAGON NO. 120
MADE BY FREMONT CARRIAGE MANUFACTURING COMPANY

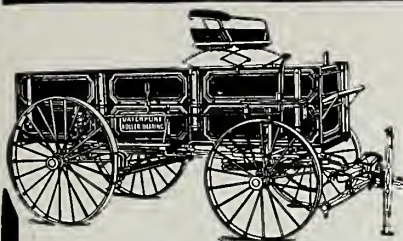
Bodies
42 inches
wide.
Have drop
end gate
with chains.
Hang low
on duplex
springs.



Uses the
celebrated
"Fitch Gear"
"Short Turn"
with
high wheels,
wide body
hung low.

Sizes: 1 1/8-inch, 1 1/4-inch, 1 3/8-inch and 1 1/2-inch axles. Bodies: 7-foot, 8-foot, 9-foot, 10-foot; 42 inches wide

THE NAME OF MAKERS IS GUARANTEE OF HIGHEST QUALITY



The Surest Sign
That You Are a

Progressive Farmer

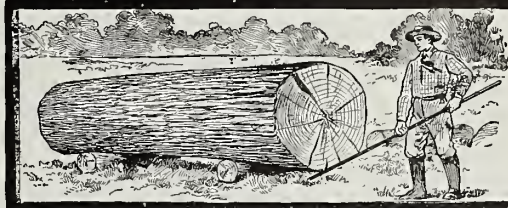
is the Ownership of a

DAVENPORT Roller-Bearing Steel Wagon

You know a farmer by the implements he uses. And the surest sign of progressiveness is in the Davenport Roller-Bearing Steel Wagon. Some day every farmer will own a Steel Wagon. But the far-sighted, money-making farmer of today is using the Davenport now—is benefiting from its many advantages now. He's setting the pace—his neighbors will soon follow, but he's getting the extra satisfaction now.



You
Know
About
This

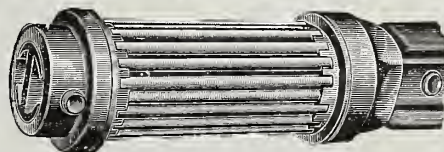


You know how much easier it is to roll a log than it is to drag it. The ordinary wagon is little more than dragged in comparison with the Davenport. That makes the wonderful difference in the draft. Think of your horses when you buy your next wagon. Remember also that Roller-Bearings mean more trips, easier trips, with fewer horses.

The Davenport owner knows the value of these features: The all-steel construction which means lifetime service. The guaranteed capacity of 5000 pounds which assures safety under heavy loads. The gears of solid steel rolled into its strongest forms and trussed like a bridge, which combines lightness and strength. The wheels of steel, with strong, round spokes forged solidly into the hubs and hot-riveted in the tires, which means that there's nothing to dry apart, shrink, rot or work loose. The ROLLER-BEARINGS insure 30% to 50% lighter draft. No tires to set; no breakdowns; no repairs and the automobile hub enables him to oil without removing the wheels.

You should know what these advantages really mean to you now. Write us for full information contained in Package No. 22, and we will be pleased to write you fully, whether you are in the market now or not.

Davenport Wagon Company, Davenport, Iowa



The Roller Bearing.

nearly all of which has been accomplished in recent years, since the establishment of the distributing agency.

The marketing agency which I have referred to is an organization consisting of all the principal shippers and growers, and its object is to widen the distribution of fruit, to build up new markets, as well as to see that reasonable prices are maintained, so as to avoid the ruinous competition of former years. This organization is under the control of a board of managers, who are constantly in touch with the different market conditions prevailing throughout the entire country, as well as the receipts of fruit at all Eastern points. Reports are obtained daily, and the board of managers hold frequent meetings, their actions being guided by the law of supply and demand, as well as information covering conditions. This enables them to keep in close touch with the entire

situation. We maintain agencies throughout the entire Eastern country, from whom these reports are received and under whose supervision the fruit is sold at the different large centers where auction markets are maintained. By auction markets we mean such cities as Chicago,

New York, Boston, Philadelphia, Minneapolis, and other large places which have been selected as distributing centers. In addition to these auction centers, we have numbers of smaller markets which are designated as f. o. b. points, and at which points no auctions are ever held, their

VEHICLES AND AGRICULTURAL IMPLEMENTS

THE BEST OF
ORCHARD AND GARDEN TOOLS
A SPECIALTY

**GILBERT - VAUGHAN
IMPLEMENT CO.**

HOOD RIVER, OREGON

LESS WORK

Drawn by two medium horses.

Will cut 28 by 30 acres or double-cut 15 acres in a day.

Will move 15,000 tons of earth one foot in a day.

Runs true in line of draft and keeps the surface true. All other Disk Harrows have to run in the half lap.

Has Improved reinforced main frame, and improved standards.

Don't be deceived by poor imitations or infringements.

There's only one original Cutaway" and it's Clark's.

Saves time. Saves labor.
Saves money.

CLARK'S CUTAWAY TOOLS

BIG CROPS

Crops increased 25% to 50%.
Better Grain, better Hay, better Fruit.

Takes place of Plow and Harrow.

Jointed Pole takes all the weight off the horses' necks.

We make 120 sizes and styles of Disk Tools.

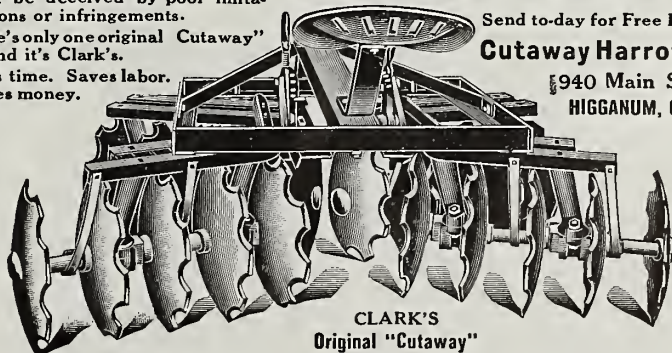
Every machine fully warranted.

Thousands in use and giving satisfaction.

If your dealer won't supply you, we will.

Send to-day for Free Booklet.
Cutaway Harrow Co.

940 Main Street
HIGGANUM, CONN.



CLARK'S
Original "Cutaway"

Mitchell, Lewis & Staver Co., Western Agents, Portland, Oregon

Stranahan & Clark

DEALERS IN

Commercial Fertilizers
Land Plaster, Lime
Plaster Paris, Cement
Building Plasters
HOOD RIVER, OREGON

Burpee's Seeds that Grow

140 VARIETIES ANY QUANTITY

Plenty of stock in our 40,000 pounds

Growing Plants as season requires

All makes high grade

Pruning Tools

Garden Tools

Hose and Spray Nozzles

International Stock and

Poultry Food

International Remedies

Incubators and Brooders

Everything for Building

Everything for Furnishing

Stewart Hardware & Furniture Co.

22,000 feet floor space Hood River, Oregon

Hawkeye Tree Protectors



Give dollars worth of protection at a fraction of a cent cost. Don't take a chance with your young trees. One rabbit will kill many in a single night. Protect yours with Hawkeye, the protector that rabbits, mice and other tree gnawers can't gnaw through—the protector that protects against cut worms and prevents trees becoming skinned or bruised by cultivator or lawn mower.

Hawkeye tree protectors are elm veneer chemically treated. They are easily applied to the trees and will last until the tree is beyond the need of protection.

The value of one tree is more than all the Hawkeye tree protectors you need will cost you. Send us your order before some of your trees are killed—you'll regret it if you wait until too late.

Price in lots of 100..... 1 cent apiece
 Price in lots of 1000..... 3/4 cent apiece

Burlington Basket Company
118 Main Street, Burlington, Iowa

G. M. WESTLAND, Wenatchee, Wash.
 State Agent for Washington.

RESOURCES AND OPPORTUNITIES

There is more doing in the West today in the way of progress and development than in any other section of the United States. If you are interested and want further information about opportunities and resources of a vast new empire, use the coupon.

The Pacific Monthly Company,
 Portland, Oregon.

Find enclosed 25 cents, for which please send me three recent numbers containing articles about resources and opportunities in the West.

Name.....

BF Address.....

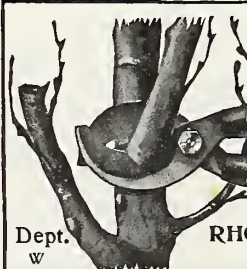
prices being based on f. o. b. shipping point; and these prices are made by our board of managers, and must be maintained by all members. The jobbers in these markets favor an organization of this kind, as it protects their interests as well as us at this end of the line, they knowing that other dealers cannot buy any cheaper than they can; and knowing that, they do not object to paying fair prices. In fact, many dealers prefer buying this way, as they can get just the assortment they desire, and when they need them, and these shipments are sold subject to sight draft with bill of lading attached and inspection upon arrival. In cases where cars arrive in damaged condition, due to causes unknown, and

it is necessary in order to accomplish delivery to make an allowance, these allowances are handled on a business basis by us, and we carefully investigate the complaint, and where the demand is considered just and proper an allowance is promptly made. This affords protection to the shipper and grower from unscrupulous buyers, who, in former years, were constantly demanding a reduction without just cause. We are also maintaining traveling representatives whose duty it is to increase the demand at established points, and to create new markets, and through their efforts, points which a few years ago were only purchasing small quantities have now more than doubled their consumption, and in many instances, quadrupled it. It is a matter of education and persistent effort to encourage consumption in proportion to the increase of supply. For several years we have been in the habit of employing more than one representative in the various Eastern markets, but we have demonstrated conclusively that by pursuing this system we have not been able to obtain the best results, and from now on will only be represented by one agent in the various markets of the country.

Auction sales are also conducted under our supervision, and it will only be a short time when we will conduct our own auctions. How different is the auction system of today, as compared with the methods of old commission men, who did not want you to know what your fruit really brought, and would not permit inspection of their books; but the auction of today is open to every one, and every one knows just what price fruit sells for, and every one can take the prices down if he wants to. Catalogues of the different cars are made up before the sale, and the buyers go over the fruit, which is all arranged in the auction room, and make notes about the quality, condition, etc., and then adjourn to the salesroom, which is generally somewhere near where the fruit is displayed, and then bid for what they want. After the sale, the prices realized are sent by wire to the parties who shipped the fruit, and catalogues showing the prices realized are printed and mailed to the consignors. These catalogues of sales are absolutely correct, and the auctions are conducted in a fair

Parties Anticipating Preserving Fruits or Vegetables

or other products, for consumption or exhibition, should send 50 cents to A. W. Miller, 69 Fifth street, Portland, Oregon, for a copy of his booklet, entitled, "How to Preserve Food Materials for Display or Consumption," containing some twenty-eight formulas for preserving fruit and vegetables, five for preserving fish, five for meats, and several for preserving eggs and milk, besides telling when, what and how to select your material, and how it should be handled, the size and pattern of jars best suited for certain material, also giving some fifteen valuable hints and helpful suggestions for success.



RHODES DOUBLE CUT PRUNING SHEAR

Pat'd June 2, 1903.

RHODES MFG. CO.,
 GRAND RAPIDS, MICH.

THE only pruner
 made that cuts
 from both sides of
 the limb and does not
 bruise the bark. Made in
 all styles and sizes. We
 pay Express charges
 on all orders.
 Write for
 circular and
 prices.

Seeds

THE KIND YOU CAN'T KEEP IN THE GROUND

They grow, and are true to name.

Write for prices on your wants.

188 Front Street

J. J. BUTZER

Portland, Oregon

Poultry Supplies, Spray, Spray Materials, Fruit Trees, Etc.

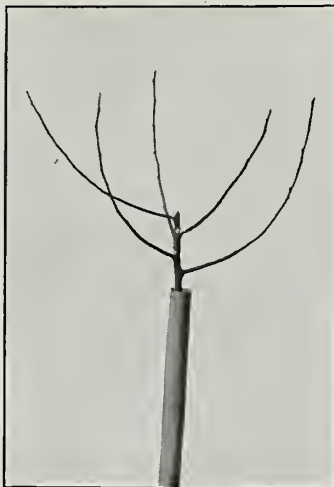
and impartial manner. In most markets sales take place daily; in others, three times a week. It has not been the custom to hold auctions on Saturday, so as to give the trade a chance to clean up and start in fresh on Monday morning. Our various large branches, or those which are near transfer and junction points, keep in daily touch with each other, so that if more or less cars are needed in any market, diversions can be made. It is well known that some fruits meet with more favor in one market than they do in others, and we endeavor to place the fruit where it will do the best.

The results accomplished by organization have been numerous, and the grower who used to get red ink returns is now getting remunerative ones. It has also increased the value of orchard lands, and has had the effect of reducing the marketing expenses that the producers had to pay. While the results have been beneficial, we are looking for much better ones in the future. The organization has never been as completely in control as is necessary, because it only represented 85 per cent of the shipments, and the outsider has caused lots of trouble to us by cutting prices. In other words, we have held the umbrella for him. But every year more and more people are coming in, seeing the results we are getting, and it was only last month that an organization of grape growers, controlling five or six hundred cars of grapes, signified their intention of joining, because the results they obtained last year were very unsatisfactory. And it was the sentiment of their meetings that all shippers and growers should get together and have their business handled under one head, because they realized that promiscuous shipments by outsiders demoralize the f. o. b. as well as the auction markets, and that without organization and co-operation they would never get the results that they desired. And it also was the sentiment of the growers that unless the outsiders did get together they would not deliver them any of their fruit. It is only a matter of time when every one will be united and we will obtain the results we are looking for.

In regard to packing, we have learned from long experience that we cannot fool the Eastern buyer. When a grower puts good fruit on top and inferior in the center and at the bottom, he will only get the price that his inferior fruit will bring. Keep the different grades separate. There is always a trade that will pay a fancy price for fancy fruit that runs the same from top to bottom.

There is another trade that wants a cheaper grade and will buy a cheaper grade readily, and the producer will always realize more money by keeping the grades separate. With this object in view, and knowing the heavy increase in production, we have taken up the standardization of fruit in a more vigorous manner than ever before, because we have proved time and time again that it is quality that pays the producer.

Our organization has, of course, very large expenses, as it is necessary that we do a stupendous amount of work, but the results that it gains more than offset the



The Best Tree Protector

Made of Yucca Palm. A perfect protection against rabbits, grasshoppers, heat of the sun, borers and frost, and keeps the tender bark of the young trees moist and healthy. Prevents sun scald.

Quicker to put on than any other protection; no strings to tie; is open grained and allows free circulation of air. Can be taken off to spray the trees, and is not affected by rain.

PRICE \$1.50 PER HUNDRED

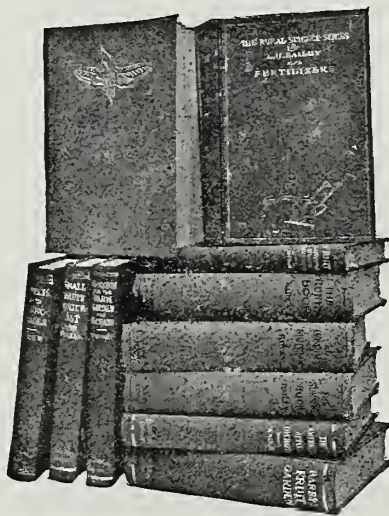
A. Whitehead Hood River, Oregon

Do You *Always* Know

what to do?

When and why?

The Answer is NO!



THE individual cannot command complete knowledge. Books, the right kind of books, *are the inspiration, the authoritative guide*, that enables you to command success.

No matter what your training or experience, you cannot retain the many details nor keep pace with the rapid advancements being made in

HORTICULTURE, AGRICULTURE POULTRY AND BEE KEEPING

INTELLIGENT understanding creates an absorbing interest that insures success.

Modern methods are the results of years of exhaustive research, experiments and study, gleaned by the greatest minds.

These results, carefully compiled for the ready reference of the practical worker, should be in the hands of every Grower, Poultryman or Bee-keeper, whether he is an amateur or a professional.

A Post Card will bring you our Select List of the most valuable and recent standard works by recognized authorities

ALL BOOKS ARE SENT POSTPAID

Our Catalogs of "Diamond Quality" Seeds and Supplies, Nursery Stocks, Poultry Equipment, Bee Keeper Supplies, are complete buyers guides and are free to those interested.

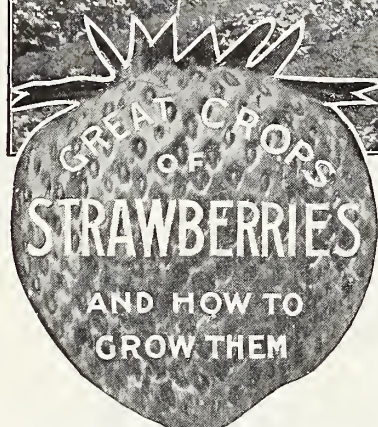
PROMPT SERVICE

Portland Seed Co.

PORTLAND : : : OREGON



HONEST VALUES



Our New Free Book Tells How. Send For It Today.



Your Big Money is in Growing Strawberries

No matter where you live or what kind of soil you have, Kellogg's Way will more than double your profits growing Big Red Strawberries right between your rows of young fruit trees, if you have no other place. You can do it easily. Let us tell you how—we've got it all explained in a nut shell—in our handsomely illustrated 64-page book entitled

"Great Crops of Strawberries and How to Grow Them"

It explains why the Kellogg Way of growing big crops of Strawberries is the sure and easy way. Tells how to prepare your soil; what varieties to set; how to care for the plants to get best results; how to market the fruit. Many fruit growers are now making a net profit of \$500 to \$800 per acre each year while waiting for young trees to come into bearing. Besides all this, the cultivating of the plants produces a healthy and more vigorous growth in the trees. Just what the trees require. Whether you have ever thought of growing strawberries or not, it is just the book that should be read by

Every Fruit Grower and Farmer

What others are doing you can do right in your own soil. C. Harder, Twin Falls, Idaho, is making as high as \$1000 per acre each season growing strawberries between the rows of his young trees. Why don't you? It will more than double your income.

Kellogg's Thoroughbred Plants

The only strain of plants that are propagated from mother plants of high fruiting power. That's why the Kellogg Strain of Thoroughbreds is so productive and bears such enormous crops of big red berries. They have a record of 15,000 quarts per acre. Large yields are often reported grown in young orchards. If you want to make some easy money, get our 1911 book. IT'S FREE.

R. M. KELLOGG COMPANY,

Box 355

Three Rivers, Michigan

expense, and the business today is done very much cheaper and better than it ever was. Individuals would find it very hard to do this work without heavy expenses, but the expenses are evenly distributed among the various members according to the business they do. It is a case of "United we stand, divided we fall." We must not allow ourselves to think that one section is raising or going to control all of the fruit. Utah, California, Colorado, the Northwest and the Eastern states are constantly increasing their output, and competition is getting keener, and it is constantly necessary that

we keep putting forth our best efforts and keep trying to better our system of handling. With the superior quality of Utah fruit, which, if packed in a merchantable manner, using care and judgment to please the buyer, there is no reason or excuse why this state should not very quickly take the lead, for there are no finer Elberta peaches or Jonathan apples raised than those which come from this State of Utah; and I want to mention that Utah and California will never compete with each other on Elberta peaches, as our California peach season is practically over when Utah starts in.

In conclusion, I would ask you to remember that you cannot raise fine fruit, or fruit that will bring you satisfactory returns, unless you take care of your orchards. Good pruning, proper spraying and cultivation are necessary. The growing and care of fruit orchards is getting to be a science, and our national government is taking these matters up, and tries to give to the producer all the assistance it can, but unless we help ourselves no one will help us.

Referring to Dr. Ball's talk at this morning's session: I had a very pleasant journey with him throughout the various sections of California, Oregon, Washington and Colorado, but found that every place he went the land was of very poor quality, so I would like to give you the amount of the various productions from the State of California, from statistics which have been furnished for the year 1908, which are as follows:

Wheat	\$19,000,000
Barley	27,000,000
Hay	32,000,000
Dairy products	25,000,000
Oil	28,980,000
Eggs	767,856
Beans	6,493,950
Potatoes	5,479,145
Beet sugar	6,972,910
Citrus fruits	23,545,400
Green deciduous fruits.....	12,306,400
(Grapes not included)	

This also does not include an average of 90,000 tons of prunes, 60,000 tons of raisins, 4,734,663 cases canned fruits and 51,500 tons of dried fruits, and I would ask Dr. Ball what might we have done if all the above had been raised on good land.

LOGANBERRY PLANTS

\$10 per 1,000

ASPINWALL BROS.

Brooks, Oregon

The Stark Year Book

For 1911

VOLUME II of The Stark Year Book (published annually) is nearing completion and will be ready for mailing January 15. Because of the limited edition and its high cost, copies will be sent only to those who apply for it on the coupon printed elsewhere on this page.

The Stark Year Book for 1911 is best described briefly—it is an encyclopedia of latest horticultural information, fully illustrated both in color and in black.

While issued in our interests and the nursery products grown by us, The Stark Year Book covers a greater field and is much wider in scope than the ordinary nurseryman's catalogue, since it deals with the subject of horticulture from the viewpoint of those who are engaged in fruit-growing commercially or for home orchard purposes.

Within its covers are twenty-three full page illustrations of fruits and flowers in natural color, representing* one hundred and thirteen varieties and covering apple, cherry, pear, peach, plum, grape, small fruits, and roses.

Eighty pages are devoted to descriptions, records of varieties, and the opinions of the country's most successful orchardists and scientific horticulturists. These eighty pages are profusely illustrated from photographs having a direct bearing on the subject matter.

Practical information covering the many problems of tree culture and orchard care is scattered throughout the pages of this book—information representing the meat of the experience and research work of the country's most successful orchardists and best known horticulturists. This feature of The Stark Year Book may be considered authoritative, and accepted as a safe guide.

Anyone interested in fruit or flower culture will find Volume II. of the Stark Year Book of inestimable value; a book to be kept for frequent reference, and one that will adorn the library table of any home. Those persons possessing a copy of Volume I. (1910) should not fail to apply immediately for Volume II. that their file may be kept complete.

The Stark Year Book for 1911 will be sent to any interested person on receipt of the coupon properly filled in. Postage, 10 cents.

**Stark Bro's
Nurseries & Orchards Co.**

Louisiana, Missouri

Stark Bro's Nurseries & Orchards Co.

Louisiana, Missouri, U. S. A.

Gentlemen—Kindly forward me Volume II of the Stark Year Book, for which I enclose 10 cents in stamps to pay postage.

Name

Postoffice

County....., State.....

I expect to plant.....trees about.....
(Number) (Fill in date)

The planting will be done at.....
(Give location, both town and state)

A REPUTATION TO SUSTAIN

VINELAND NURSERIES COMPANY

PROPAGATORS OF

RELIABLE NURSERY STOCK

All stock budded from bearing
Trees, Fruit and Ornamental

CLARKSTON, WASHINGTON

METHOD OF DETERMINING THE PROFIT AND LOSS

BY PROFESSOR J. A. BEXELL, OREGON AGRICULTURAL COLLEGE, CORVALLIS

THE old year is about to usher in a new one. What has been achieved during the past year? What were its victories? Its failures? How may we profit next year by the mistakes of the past?

Such questions are naturally forced upon us at this season of the year. There are various ways of answering these questions. Business men generally take advantage of slack trade after the holidays to take stock and to "check up" on the results of the year's work.

It is very unfortunate that so few farmers follow the excellent custom of taking an annual inventory. There is

nothing difficult about it. No bookkeeping whatever need be done. No special form need be observed. What is necessary is merely to list what you own and what you owe. A very simple form is shown below:

FINANCIAL STATEMENT NO. 1, HARRIS FARM

April 1, 1908

Resources

Farm, 160 acres, with buildings.....\$8,000.00

Produce:

200 bushels corn	\$.50	\$100.00
150 bushels oats .....	.45	67.50
200 bushels wheat .....	.85	170.00
20 tons hay	6.00	120.00
Potatoes and vegetables		50.00
		\$ 507.50

Stock:

6 horses, average.....	\$100.00	\$600.00
20 cows, average.....	40.00	800.00
11 steers, average.....	12.00	132.00
5 heifers, average.....	11.00	55.00
12 hogs, average.....	6.00	72.00
100 sheep, average.....	3.00	300.00
		\$1,959.00

Poultry:

150 chickens, average.....	\$ 45.00	\$ 67.50
21 turkeys, average.....	75.00	15.75
		\$ 83.25

Implements:

1 hay rake.....	\$ 15.00	\$ 15.00
1 binder.....	125.00	125.00
2 plows, average.....	10.00	20.00
2 harrows, average.....	12.50	25.00
1 mower.....	40.00	40.00
1 grain drill.....	50.00	50.00
2 wagons.....	110.00	110.00
Supplies.....	25.00	25.00
2 sets harness.....	90.00	90.00
1 buggy.....	100.00	100.00
Tools.....	50.00	50.00
Household goods.....		350.00
Life insurance.....		964.36
Cash.....		170.00
		\$170.00

Total\$12,684.11

Liabilities

Labor (unpaid).....	\$ 75.00
Accounts payable.....	125.15
Mortgage due April 1, 1910....	3,000.00
	\$3,200.15

Net worth\$9,483.96

The inventory may be considered the most important document among the farm records, because without it no results at all can be obtained. It should be taken at such a time as will give the most accurate results with the least expenditure of labor. This differs widely in different localities. January 1 seems the most natural beginning of the fiscal year, but the objection is that at this time there is apt to be a large quantity of feed and supplies on hand.

April 1 would be a better date so far as the stock on hand is concerned, but inconvenient in many localities on account of the pressure of spring work. Whenever it is taken, it should be accurate. No guesswork should be tolerated; weigh and count, do not estimate. Then assign the actual market value to the property, taking due account of the depreciation.

Right here is where serious errors are committed by the average farmer. Neither an old wagon nor an old horse is worth as much as new ones. The same holds true with very few exceptions of all equipment, animals, houses, and improvements. The question as to

Columbia and Okanogan Nursery Company

Wenatchee, Washington

PROPAGATORS AND GROWERS OF

The Cleanest, Thriftiest, Best Rooted Nursery Stock in the WORLD

WHOLESALE AND RETAIL

SEND US YOUR ORDER

Supplying Large Commercial Orchards a Specialty

QUAKER NURSERIES

We have a large stock of YELLOW NEWTOWN PIPPINS, SPITZENBERGS, JONATHANS, WAGENERS, ROME BEAUTIES, and all of the leading varieties of apples.

We also carry a heavy line of BARTLETT, COMICE AND BEURRE D'ANJOU PEARS.

A general stock of peaches, such as EARLY CRAWFORDS, ELBERTAS, LATE CRAWFORDS, FOSTERS, TUSCAN CLINGS, PHILLIPS, MUIR, EARLY COLUMBIA, Etc.

Small fruits in great abundance, STRAWBERRIES, BLACKBERRIES, RASPBERRIES, DEWBERRIES, GOOSEBERRIES, CURRANTS, GRAPES.

H. B. PATTERSON, MEDFORD, OREGON,

Special Selling Agent for Southern Oregon.

C. F. LANSING, Salem, Oregon

NURSERY CATALOG

New, handsome, instructive, up-to-date, describing

Fruit and Ornamental Trees, Shrubs, Vines, Roses, Berry Plants, etc.

Free on request. Write now, mentioning this paper.

J. B. PILKINGTON, Nurseryman, Portland, Oregon

Hood River Valley Nursery Company

Route No. 3, Box 227

HOOD RIVER, OREGON

Phone 325X

Will have for fall delivery a choice lot of one-year-old budded apple trees on three-year-old roots, the very best yearlings possible to grow. Standard varieties from best selected Hood River bearing trees—Spitzenbergs, Yellow Newtowns, Ortleys, Arkansas Blacks, Gravensteins, Baldwins and Jonathans. All trees guaranteed first-class and true to name. Start your orchards right with budded trees from our nursery, four miles southwest from Hood River Station.

WILLIAM ENSCHEDE, Nurseryman

H. S. BUTTERFIELD, President

GERMAN NURSERIES' SPECIAL OFFERS

I established the German Nurseries and Seed House 25 years ago. Steady growth of business—thousands of satisfied customers in every part of the country—testify to the success of the modest start I made in 1886. I will celebrate this anniversary with some special offers of

TREES AND SEEDS THAT GROW.

Especially fine, complete line of fruit trees, Western varieties; berry bushes, grape vines, bulbs, seeds for the farm, the vegetable and flower garden. Write today for beautiful new 136-page Anniversary Catalogue, free, showing Anniversary Collections at saving prices.

CARL SONDEREGGER

GERMAN NURSERIES & SEED HOUSE

Box 217

Beatrice, Neb.

TWENTY-FIFTH ANNIVERSARY

J. F. LITTOOY

CONSULTING HORTICULTURIST

Orchard director, orchard schemes examined, orchard plans submitted, orchard soils and sites selected, nurseries visited and stock selected, values examined for farm loans, purchasing agent for land and orchard investments, acts as power of attorney in selection of Carey Act lands.

MOUNTAIN HOME, IDAHO

what rate shall be charged off annually, so as to create a sinking fund with which to renew the depletion, has been an open question with accountants since time immemorial. It is particularly difficult to determine the depreciation of live-stock, work horses, and depletion of the fertility of the soil. Without entering into a discussion of the subject, I give below the experience and opinion of the best authorities on the subject. The thoughtful farmer will find no difficulty in adjusting these rates to suit his conditions. For the purpose of general estimates:

Buildings (including insurance and repairs)	5 per cent
Horses, above 5 years	10 per cent
Milch cows	8 per cent
Machinery and tools	10 per cent
Depletion of land on account of continued cropping after fifth crop	2 per cent

How to Determine the Profits—Let us assume that your last year's inventory was as above and that you have taken one of exactly the same form, now showing a net worth of \$10,223.98; the statement of profit and loss would be as follows:

STATEMENT OF PROFIT AND LOSS

Net worth now	\$10,334.98
Net worth last year	9,483.96
Net profit	\$ 851.02

This result can be obtained without any bookkeeping whatever, but a simple set of books are indispensable.

The objection to the above statement is that while the net profit is shown, it gives no clue to the result of individual enterprise. One may have been profit-

able, while another resulted in a loss. The chief object of bookkeeping is to discover the leaks in one's business and stop them.

Hood River Nurseries

Have for the coming season a very complete line of

NURSERY STOCK

Newtown and Spitzenberg propagated from selected bearing trees. Make no mistake, but start your orchard right. Plant generation trees. Hood River (Clark Seedling) strawberry plants in quantities to suit. **Send for prices.**

RAWSON & STANTON, Hood River, Oregon

500,000 Clark Seedling Strawberry Plants

Fall or Spring Delivery

WRITE

Ideal Fruit and Nursery Company

HOOD RIVER, OREGON

Burbank's New Strawberry

THE PATAGONIA

The Most Productive The Most Delicious
The King of all Strawberries

Plants for Sale Now

Send Postal for History, Description and Prices

LUTHER BURBANK

Please Mention this Paper

Santa Rosa, California, U. S. A.

YOU SHOULD GROW STRAWBERRIES



THEY cost less to start, are easier grown, and are the surest croppers and the quickest money-getters of all fruits. Our "Diamond Quality" Plants have large crowns, heavy, fibrous roots, are carefully selected and true to name. The varieties we have introduced and distributed have become leading commercial sorts, yielding maximum crops of large marketable berries. That they are the **Best for Western Planters** has been proven by growing tests. Plants are packed crowns up in ventilated crates of five hundred each.

For reliable information and accurate descriptions of the best varieties for commercial or home use, see our new

AUTUMN CATALOG

IN which we list the largest, most complete assortment yet offered, of Fruit, Shade and Ornamental Trees, Shrubs, Berries, Climbing Vines, Roses, Flowering Bulbs and Roots, Ferns, Geraniums, Palms, Perennial and Bedding Plants together with much interesting and valuable information on the culture and selection of varieties. Ask for Catalog No. 201. A postcard will bring you a copy free.

Portland Seed Co.

Portland : : : Oregon



32-Page Strawberry Booklet FREE

MR. ORCHARDIST

**Increase your profits
Insure the safety of your investment**

The first cost of a fruit tree is an insignificant item, but the quality and pedigree of that tree is a powerful, **perpetual** factor of your income.

You cannot afford to plant anything but the best, the most carefully propagated trees of **KNOWN** ancestry—in other words, a strictly **THOROUGHbred** tree. Heredity is as surely transmitted by trees and plants as it is in animals. The good or bad characteristics of a tree are as surely transmitted to its offspring as in the higher forms of life. A vigorous, prolific, regular-bearing and disease-resistant tree will produce young trees of the same characteristics.

An orchard of this character is the best real estate agent you ever had when you wish to sell—the best guarantee of your income while you live—and the safest endowment you can bequeath to your widow or children. **MR. ORCHARDIST, WOULD YOU TRY TO ECONOMIZE A FEW CENTS ON THE COST OF SUCH TREES?**

The Hood River Valley is one of the most noted apple-producing sections of the world. Orchards have netted as high as \$1,800.00 an acre from a single crop of apples. From the highest earning trees of the best orchards of this valley, trees whose ancestry can be traced back generation after generation of high production and vigorous, sturdy qualities, are all of the stock of the **HOOD RIVER STANDARD NURSERY COMPANY** grown. They are **THOROUGHbred**, **PEDIGREED** apple trees.

For the season of 1910 we can offer a limited amount of extra size, apple only. Write for our guarantee and price list.

HOOD RIVER STANDARD NURSERY CO.

HOOD RIVER, OREGON

True-to-Name Nursery

Offers for fall 1910 a complete line of nursery stock, including all the leading commercial varieties adapted to the Northwest. Our trees are all grown on the best whole roots and all buds and scions used are selected from bearing and tested trees, which insures not only early bearing, but trees true to name.

Write us for prices before placing your order. We give a one-year subscription to this paper with every order of \$25.00 or more. Address

TRUE-TO-NAME NURSERY

Phone 2002K

Hood River, Oregon

NURSERY SALESMEN

Drop us a line for information regarding our splendid proposition.

Big commissions paid weekly.

OUTFIT FREE

SALEM NURSERY COMPANY

SALEM, OREGON

WHEN ARE YOU COMING WEST?

Fortunes are being made now by hundreds on small fruit ranches in the West. If you are interested in the famous fruit section about Hood River, Ashland, Medford and other equally famous sections, send in the attached coupon. It's the soil, climate, and scientific culture that makes Oregon and Washington apples famous.

The Pacific Monthly Company,
Portland, Oregon.

Enclosed is 25 cents, for which please send me three recent numbers about famous fruit sections of the West.

Name.....

BF Address.....

A UNIFORM BUYING CONTRACT AND AGREEMENT

ADOPTED BY THE INTERNATIONAL APPLE SHIPPERS' ASSOCIATION

THIS AGREEMENT WITNESSETH: That of.....sells to.....his crop of apples on his farm (or farms) situated in.....to be packed in uniform grades and in standard barrels, same being as per specifications of the International Apple Shippers' Association printed on the back hereof and made part of this contract. The seller agrees to pick the apples in a careful manner, when fruit is in proper condition, and buyer so designates; to board the packing force of buyer.....while engaged in barreling in his orchard, and to haul the apples to.....railroad station promptly after being packed. Buyer agrees to pay for apples as soon as delivered to the railroad shipping point, and seller acknowledges payment of.....dollars on contract. Price to be paid for No. 1 grade, per barrel, is.....dollars, for No. 2 grade, per barrel, is.....dollars.

Seller agrees to haul empty barrels from.....to his orchard.....and to protect from storm the barreled apples while in his orchard.

SPECIFICATIONS

Standard Barrel—A barrel which is seventeen and one-half inches in diameter of head, and twenty-eight and one-half inches in length of stave, and bulge not less than sixty-four inches outside measurement.

Requirements for No. 1 Apples—The standard size for No. 1 apples shall be not less than two

and one-half inches in diameter and shall include such varieties as the Ben Davis, Willow Twig, Baldwin, Greening and other varieties kindred in size. That the standard for such varieties as Romanite, Russet, Winesap, Jonathan, Missouri Pippin and other varieties kindred in size shall be not less than two and one-quarter inches. And, further, that No. 1 apples shall be at the time of packing practically free from the action of worms,

HEADQUARTERS FOR THE BEST ROOTED Nursery Stock That Grows

Large stock of Jonathan, Rome Beauty, Delicious, Winesap, Spitz-emberg, Newtown Pippin, etc.

Peach, Pear, Cherry and Small Fruits

Also ornamental trees, shrubs and roses, all true to name. Write far prices.

THE CASHMERE NURSERIES

Located in the Wenatchee Valley

G. A. LOUDENBACK, Proprietor

CASHMERE, WASHINGTON

THE MIRACLE OF WATER

Millions of acres of raw land are being reclaimed in the West by irrigation. Water makes this desert waste the most fruitful land in the world. No magician has wrought such wonders with magic wand. Interested? Send the coupon.

The Pacific Monthly Company,
Portland, Oregon.

Enclosed find 25 cents, for which please send me three recent numbers telling about the Miracle of Water.

Name.....

BF Address.....



C. F. WHALEY
Originator of the
Ballygreen System
of Certified
Pedigreed Trees

BALLYGREEN SYSTEM OF PEDIGREE TREES

Selected

Certified

Combines the best practices of horticulture with honest, efficient business methods, insures the fruit grower, making it certain that he will get the kind of trees he orders and a very high quality of fruit when the trees bear.

BALLYGREEN NURSERIES

HANFORD, WASHINGTON



H. W. REAUGH
Graduate
in Horticulture
Washington State
College
Field Manager
Ballygreen Nurseries

defacement of surface or breaking of skin, shall be hand-picked from the tree, a bright and normal color and shapely form.

Requirements for No. 2 Apples—No. 2 apples shall be hand-picked from the tree. Shall not be smaller than two and one-quarter inches in diameter, and of fair color for the variety. The skin must not be broken nor the apple bruised, and must be practically free from scab and other defects. This grade must be faced and packed with as much care as No. 1 fruit.



NEW ORLEANS appears unduly excited over the fact that one of its leading citizens, Mr. Thomas Sweeney, subscribed \$5,000 to the exposition fund. Mr. Sweeney has just returned from Europe, evidently with the impression that Europe never heard of San Francisco, or of California. The following is from the New Orleans Item: "In all of eleven European countries which I have just visited everybody is in favor of the Panama Exposition being held here," said Mr. Thomas Sweeney, who returned to New Orleans from Europe on Friday morning. Mr. Sweeney has the distinction of having contributed the largest amount of any individual to the exposition—\$5,000. Of course firms and corporations have passed this mark, but no single person has up to this time. "It is certain that every important country in Europe will have a fine exhibition here," continued Mr. Sweeney. "I was astonished at the interest which is being manifested in the New Orleans celebration. New Orleans is as well known in every part of Europe as New York City is in this part of the country."

San Francisco also has reason to be proud of the liberality of the subscribers to the exposition fund in view of the fact that there are just seventy individuals who subscribed \$5,000 or more. Twenty-seven individuals subscribed \$25,000 each.

For fear the New Orleans enthusiasts may regard this statement as a fairy tale the names of these twenty-seven subscribers are here given: Antone Borel, W. D. Bourne, Frank H. Buck, Francis Carolan, John A. Chanslor, Chas. Templeton Crocker, James L. Flood, W. P. Hammond, W. R. Hearst, W. F. Herrin, C. A. Hooper, Geo. W. Hooper, John A. Hooper, R. M. Hotaling, C. Frederick Kohl, William Matson, Ogden Mills, Lewis F. Montegale, Mrs. A. M. Parrott, W. S. Porter, Leon Sloss, A. B. Spreckels, Rudolph Spreckels, Harry L. Tevis, Wm. S. Tevis, F. Tillman, Jr., W. G. Irwin. These individual subscriptions are exceeded by the contributions of various firms and corporations just as firms and corporations in New Orleans have exceeded the \$5,000 contribution of Mr. Sweeney.

WE HAVE AN

ATTRACTIVE PROPOSITION

For live dealers to handle the best air compressor sprayer on the market. Well advertised. See page 76, September issue of Better Fruit. E. P. MARVIN, Jr., Lockport, New York.

SEED Catalog NOW READY

We want every Farmer, Gardener, Poultryman and Stockman to have a copy of our new Seed Book. It contains 120 pages of everything needed to make a success of farming in the West. In this respect Lily's Seed Book is better and more authentic than other publications of this nature. It is the experience of over twenty-five years of honest seed selling in the West. Lily's Seeds are Best for the West and are sold by your dealer. Send today for new catalog.

THE CHAS. H. LILLY CO.
SEATTLE PORTLAND

RICHLAND NURSERY

Richland, Washington

FRUIT TREES

Complete stock of leading varieties of Apples, Pears, etc.

WRITE US FOR PRICE LIST

Malthoid Roofing

The dependability of Malthoid Roofing has been proven by special tests covering a period of many years.

Malthoid will last as long as the building it covers. It is inexpensive, easy to lay, and your roof troubles are over when Malthoid is laid.

Made by THE PARAFFINE PAINT COMPANY

San Francisco and Everywhere

Stewart Hardware & Furniture Co., Agents, Hood River, Oregon

IT'S FREE

Send for it.
A new
and valuable
book on

Cheerful Homes

This booklet is
illustrated
with pictures
of the most
beautiful
bungalows
of Southern
California

TREES

Everyone true to name—Buy the best

The Largest and Finest
Assortment on the Coast

OUR CATALOGUES: "CALIFORNIA HORTICULTURE," "THE FRUIT-GROWER'S GUIDE." Beautifully illustrated. Describes 2,000 different varieties of trees and plants. Contains valuable suggestions about planting, pruning and care of orchards. Mailed for 25 cents in stamps. Something new in an Annual Illustrated Price Catalogue, mailed free on application.

BURBANK'S NEW CREATIONS

Send 25 cents for beautifully illustrated booklet, in colors, describing the Santa Rosa, Gaviota, Formosa and Vesuvius plums, the Rutland plumcot, Royal and Paradox walnuts. We are sole propagators and disseminators. Paid up capital \$200,000 Established 1884

Fancher Creek Nurseries, Inc.

GEO. C. ROEDING, Pres. and Mgr.
P. O. Box 10 Fresno, California

THE Sunnyside Nursery Company

Capital paid up, \$100,000

WE HAVE NO AGENTS
SELL DIRECT

GET our prices and save money. Trees first-class. We lead, others follow. Have several hundred thousand finest peach trees ever grown in the West. Cherry, pear and apple in numbers that foot up millions. If planted in a line would make over three rows, the usual distance of planting, from Seattle to New York city.

WRITE US AND MENTION
THIS PAPER

Main Office
SUNNYSIDE, WASHINGTON

OUR FALL SHIPPING

Is over, and our many salesmen are now taking orders for spring delivery. We have a fine force of salesmen at work in different parts of the Northwest placing our stock in newly developed fields as well as in the older settled districts. Whenever you meet one of our men you can tell by his enthusiastic manner and confident bearing that he knows he is representing a line worthy of his best efforts.

It is easy for a salesman to sell our stock, for our biggest inducement is **quality**. It is a hobby with us, and we leave no stone unturned to produce the best stock it is possible to grow. That our efforts have not been in vain is evidenced by the many pleased customers we have.

You may need some stock. If so, we want to hear from you. We are in a position to give you very prompt service and A-1 stock. No matter whether you are a large or small planter, we can serve you well, and to your complete satisfaction.

Catalog on Request

**Yakima Valley Nursery
Company**

Toppenish, Washington
MORE SALESMEN WANTED

A TABLE OF DISTANCES

By Professor P. J. O'Gara, Assistant Pathologist,
Department of Agriculture, in Rogue
River Fruit Grower.

THE question is often asked, how many trees or plants can be set per acre at a given distance apart. It will be found convenient to have at hand a table which will give the number without having to resort to a mathematical calculation, and to this end the table below has been made out, giving the number trees or plants per acre planted according to the "square" and "triangular" methods.

Distance Apart	Square	Equilateral Triangle
1 foot each way.....	43,560	50,300
2 foot each way.....	10,890	12,575
3 foot each way.....	4,840	5,889
4 foot each way.....	2,722	3,143
5 foot each way.....	1,742	2,011
6 foot each way.....	1,210	1,397
7 foot each way.....	888	1,025
8 foot each way.....	680	785
9 foot each way.....	537	620
10 foot each way.....	435	502
11 foot each way.....	360	416
12 foot each way.....	302	348
13 foot each way.....	258	298
14 foot each way.....	222	256
15 foot each way.....	193	222
16 foot each way.....	170	196
17 foot each way.....	151	174
18 foot each way.....	134	154
19 foot each way.....	120	140
20 foot each way.....	109	125
21 foot each way.....	99	114
22 foot each way.....	90	104
23 foot each way.....	82	94
24 foot each way.....	75	87
25 foot each way.....	70	80
26 foot each way.....	64	74
27 foot each way.....	60	70
28 foot each way.....	55	64
29 foot each way.....	51	60
30 foot each way.....	48	56
31 foot each way.....	45	52
32 foot each way.....	42	49
33 foot each way.....	40	46
34 foot each way.....	38	43
35 foot each way.....	35	41
36 foot each way.....	33	38
37 foot each way.....	31	36
38 foot each way.....	30	35
39 foot each way.....	28	33
40 foot each way.....	27	31

Rule for the Square Method—Multiply the distance in feet between the rows by the distance the plants are apart in rows, and the product will be the number of square feet for each plant or hill, which divided into the number of feet in an acre (43,560) will give the number of plants or trees to the acre.

Rule for the Equilateral Method—Divide the number required to the acre "square method" by the decimal .866. The result will be the number of plants required to the acre by this method. The meaning of the rule for the "square method" is that in dividing the number of square feet in one acre by the product of the distance in feet between the rows by the distance the plants are apart in rows, the quotient indicates the number of square blocks into which an acre is divided. Therefore, each block will have one tree placed in its center, which, of course, means that while the number of blocks are indicated by the rule the number of trees are also shown. In making a diagram of any plot of ground, the number of squares will be indicated, and each square will have a tree in the center of it. This will give a turning place or strip on each side of the plot equal to one-half the distance between the tree rows.

The rule for the "equilateral method" may be explained by stating that each tree, instead of growing in a triangular plot is really placed in a parallelogram whose longest side is equal to the distance between rows in the "square method," and whose shortest side is equal to .866 of this distance; or the ratio of the perpendicular drawn from an angle of an equilateral triangle to one of its sides. In making the tables decimals have been omitted, and the nearest whole number used.

GET CATALOG AND PRICE LIST
420 Acres Devoted to Nursery Purposes

THE WOODBURN NURSERIES

Established 1863 by J. H. Settlemier

Grower of Choice

Nursery Stock

F. W. SETTLEMIER

Woodburn, Oregon

WHEN WRITING ADVERTISERS MENTION BETTER FRUIT

TREES in Quantity, Price and Quality

Growers and importers of a full line of all nursery stocks—apples, pears, prunes, cherries, peaches, etc. Large or small orders—we fill all. Just drop us a few lines giving your list of wants, and receive offers which we know will interest you. Have always given satisfaction and can do so now.

We want to get in touch with planters.

CARLTON NURSERY CO.
Carlton, Oregon

PORTLAND WHOLESALE NURSERY COMPANY

Rooms 1 and 2 Lambert-Sargeant Building
Corner East Alder Street and Grand Avenue
PORTLAND, OREGON

Lafayette Nursery Co.

Growers of Standard Sorts and
Commercial Varieties

APPLE, PEAR, PEACH, CHERRY, ETC.

*Remember, the Root System
is one of the most important factors.
Ours are unsurpassed.*

Regardless of your wants, you cannot afford to place your order until you hear from us. Write today.

Address: LAFAYETTE, OREGON
Mention "Better Fruit"

Good Trees

When you want a first-class article in any line of merchandise, you patronize a dealer who makes it his business to handle a good article.

You prefer to deal with a merchant who handles staple lines of dependable merchandise, rather than with one who carries a few of the articles in question as a side line.

There is far more reason for using similar care in buying your trees.

Our business is the nursery business. That's all we do from one year's end to the next. We try to grow good, dependable stock, sell it at a fair price through dependable salesmen, and deliver it in good condition. We are in business twelve months in the year, and expect to remain in business for an indefinite time. That's worth considering.

Write us your wants.

Washington Nursery Co.
Toppenish, Washington

Agents everywhere More wanted

Mount Arbor Nurseries

E. S. WELCH, Proprietor

133 Center Street, Shenandoah, Iowa

A Full Line of General Nursery Stock

Apple Seedlings—A surplus of heavy branched roots.

Apple Grafts—Piece and whole root made to order.

Cherry Trees—A heavy stock of leading sour varieties.

Currants

Concord Grapes

Blackberries

Roses—Splendid stock Hybrid Perpetual, Moss, Ramblers, Climbing.

**ORNAMENTAL TREES, SHRUBS,
VINES, FOREST TREE SEEDLINGS**

You Want the Best? WE HAVE IT IN TREES

They have the highest possible developed root system. It's the root which counts

Mr. Buyer:

No matter what quantity you may require, let us figure with you on your wants for this season, or send for our price list, and if you entrust your order with us we feel certain of retaining you as a permanent customer.

You will get what you order

Yakima and Columbia River Nursery Co.

North Yakima, Washington

Growers of
Selected Yakima Valley Fruit and Ornamental Nursery Stock

"NONE BETTER"

Salesmen — A few wanted. Write for terms

HENRY B. MILLER, United States Consul at Belfast, writes to the Oregonian under date of October 4 as follows:

On October 1 I find in the markets of Ireland and Great Britain Gravenstein apples from California and Oregon selling at the commission houses at \$3 per 50-pound box. I also find California Yellow Newtown Pippins in the market at this early date. I find also large quantities of Beurre-Hardy pears from California in 20-pound boxes selling at \$2 per box. The Keiffer is in the market in barrels from the United States, selling at much lower prices. The California Bartlett pears are at this date entirely out of the market. These California and other pears from the United States are competing with the French pears. Of the many varieties of the French pears in this market, Duchesse seems to be the choice. Many of them, however, are defective with scab and other diseases.

I find also small quantities of Coes Golden Drop plum and the Italian prune from Idaho, in fact, all of the fruit from the United States seemed to be in very good condition with the exception of California Yellow Newtown apples. The Oregon Gravensteins, from Hood River, are bringing the highest price of any apples in this market at this time of the year.

It was something of a surprise to me, as no doubt it will be to many of the fruit growers of the Northwest, to find these varieties of our fruits in the English markets so early in the season. It all goes to prove the splendid possibilities of the

European market for the fruits of the Pacific Coast on the completion of the Panama Canal, when every variety, even our delicate fruits, can be shipped direct to European markets in refrigerator steamers at a much less rate than they are now being carried across the continent.

The English wholesale fruit dealers generally agree that this year's fruit crop in England will be a partial failure. The many thunder storms and heavy gales have shaken the unripe fruit from the trees, and what remains has only imperfectly ripened. All kinds of fruit are reported below the average, except strawberries, which were also deteriorated by the weather.

As usual, when there is a shortage of fruit in England, a readiness is shown among fruit growers on the continent to make up the deficiency. Heavy consignments from Spain, France and Italy are coming in. Means of transportation from these countries to England are cheap and quick, and these are important essentials in marketing fruits. Italy and Rhone Valley, in France, have the reputation of sending to England the best quality of pears, although a fair quality comes from Italy.

The following press report of one day's arrival (August 22) of fruits in Hull will give an indication of the fruit market in this city:

"A French steamer arrived with a quantity of greengages, William pears and plums. There will be a shorter supply this week, but the condition is better. There has been an improvement in prices. Two Belgian (Ghent) boats, with large quantities of pears, apples and plums also came to port. A cargo of grapes and onions from Spain has arrived. Grapes remain at about the same prices as last week, but prices for onions are a little higher. There is a good supply of large samples of fine English Victoria plums. Crops are very light, and prices are consequently higher."

The countries named above cannot supply the deficiency, especially in apples. This offers an opening for enlarged exports of apples and pears from America to England. Reports place the yield of apples in the Atlantic States as not above the average, and consequently promise no large surplus for export from the Eastern States. But practical experience has proved that apples can be brought from the Pacific Coast, where the yield is abundant, to Hull, and arrive in good condition and be sold at a fair profit. This was accomplished last winter with Newtown Pippins.

Apples come to England in two different packages. The cheaper varieties come in barrels, and must be disposed of quickly, generally at a low price. The choicer kinds are neatly and securely packed in boxes, arrive in excellent condition, and

Quality and Quantity Leave no Question as to Quotation

On our complete line of

**FRUIT TREES
ORNAMENTAL TREES
AND SHRUBBERY**

Salesmen wanted

Capital City Nursery Company
Salem, Oregon

To the Shrewd Business Man

A commercial orchard is a good income producer while you live, the best real estate agent you ever had when you are ready to sell, and a valuable asset to leave to your widow and orphans when you have reached the end of life's journey.

If an old reliable nursery is of any specific importance to the prospective planter, we kindly ask you to consider with us before buying your trees.

Albany Nurseries

(Inc.)
ALBANY, OREGON

THE NEW WEST

Is full of surprises. It is no longer the land of cowboys, coyotes, blanket Indians. Instead of illimitable sagebrush desert, one finds fruit laden orchards, heavy headed grain, green meadows and alfalfa fields. It's the best of God's out-of-doors country—clear skies, pure air, snowclad mountains, waterfalls, odoriferous pine woods. Read all about it in The Pacific Monthly, magazine of the West.

The Pacific Monthly Company,

Portland, Oregon.

I am interested in the New West. Send three recent numbers of your magazine, for which I enclose 25 cents.

Name.....

BF Address.....

KELLY'S TREES ARE TRUE TO NAME 2,000,000 TREES 2,000,000

For fall and spring planting. 350,000 Winesap, 350,000 Jonathan, 200,000 Rome Beauty, 100,000 Delicious and all other leading varieties in Peach, Pear, Plum and Cherry

Before Placing Your Order Write to

Tim Kelly, Proprietor Wapato Nursery, Box 197, Wapato, Washington

WRITE FOR FALL LIST—ISSUED OCTOBER 1st



THE SILVA-BERGTHOLDT COMPANY
184 Orchard Street Newcastle, Cal.

GALBRAITH "NEW LAND" FRUIT TREES **FREE FROM DISEASE GROW FASTER**

Nebraska trees thrive best everywhere—famous for heavy fruiting. Yearling apples 9c. Cut-alpa Speciosa, \$2.00 per 1000. Varieties for Northwest. We sell direct—no agents—save you one-half and pay freight. We comply with all requirements for interstate shipments. Complete Catalogue free.
GALBRAITH NURSERY CO., Box 47, FAIRBURY, NEB.

EMMETT NURSERY

THE LARGEST NURSERY PLANT IN IDAHO

OUR SPECIALTIES

PEACHES—CHERRIES—DWARF PEARS

A fine stock of all standard varieties of Apples, Fruit and Ornamental Trees, suited for the Northwest.

CHARLES P. HARTLEY, Proprietor

EMMETT, IDAHO

Winfield Nursery, Winfield, Kansas

GROW TREES OF QUALITY

Their new work, Progressive Horticulture, fully illustrated, describes trees of quality in the making

RUSSELLVILLE NURSERY COMPANY

H. A. Lewis, Proprietor

Montavilla, Oregon

A progressive and up-to-date nursery. A full line of fruit and ornamental trees. Growers of fine nursery stock. Varieties of special merit. Careful and reliable attention given to filling every order with first-class trees and plants. Satisfaction guaranteed. Nursery at Russellville, suburb of Portland. Take Montavilla car. Nursery one mile east of terminus.

FRUIT GROWERS, YOUR ATTENTION!

Royal Anne, Bing and Lambert cherry trees; Spitzenberg and Newtown apple trees; Bartlett, Anjou and Comice pears, and other varieties of fruit trees.

A. HOLADAY

MONTE VISTA NURSERY
SCAPPOOSE, OREGON

Montana Fruit Growers

AND OTHERS OF HIGH ALTITUDE

WE are now ready to book your orders for fall and spring delivery of McIntosh Red and Wageners. For Northwest fruit growers in general, a full stock of all standard varieties—Spitzenbergs, Jonathans, Winesaps, Rome Beauties, etc., and all other kinds of fruit trees and shrubbery.

THIRTY-ONE YEARS IN BUSINESS

Milton Nursery Company

A. Miller & Sons, Incorporated

Milton, Oregon

WHEN WRITING ADVERTISERS MENTION BETTER FRUIT

sell at a good price. It is the latter kind only that it would pay to send from the Pacific Coast, as they only could stand the long journey.

Fruit is comparatively cheap at the end of August. Apples sell in Hull at \$3 and \$3.50 per hundredweight, and pears at \$4.50 to \$5 per hundredweight.

An experimental shipment of apples to Southampton from the Wenatchee section of the State of Washington, made in 1908, proved so successful, both in a financial way and, greater still, in the more substantial lines of a good reputation, that in 1909 the same dealer made another shipment, this one amounting to 20,000 cases. The fruit was neatly packed, and went on the market in first-class condition. It is a matter of financial record that this Wenatchee fruit sold at the highest price above any American apple ever offered in the open English market, and much of the shipment, which was attended to by the shipper, was sold in the retail market at 8 to 12 cents per pound, and eagerly taken at that price by the best trade.

It is gratifying to note that the orders now made will more than exhaust a shipment of the same size during the crop year 1910. Of course it should be stated that the quality of this Wenatchee fruit was first-class, true to name in every case, and no seconds put in to fill up, yet much depended on the method of packing, and in that it was found superior in every way. Therein lies the way to success for the American fruit packer and shipper—good fruit, well packed, and then kept out of an auction where a combination may control prices. The Wenatchee can meet the British Columbia fruit in competition in any English market and win on merit.

Editor's Note.—Four years ago the editor of Better Fruit was then manager of the Hood River Apple Growers' Union and shipped the first Gravensteins from the Northwest to England, and also King of Thompkins the same year, so there was no occasion for Consul Henry B. Miller to be surprised in finding Hood River Gravensteins in England four years later.

Shelton, Washington, November 2, 1910.

Editor Better Fruit:

I appreciate very highly what you say in your October number about being original in preaching clean grading and quality pack of apples and pears. It was the first number of "Better Fruit" on this subject that so much interested me. I believe I am one of the first subscribers, and I have kept every number received. "Better Fruit" excels all other fruit publications that I have taken, and I have taken a large number. I see someone requests the subject of "Dwarf Apples" for discussion. I hope, too, this subject will be thrashed out by someone familiar with its subject-matter. Our trees on Puget Sound grow too tall on standard stock. Kindly give the following information: Is apple packing now in progress in the Hood River Valley? When are the packing schools held? Is the supply of competent orchard help equal to the demand? Respectfully,

C. S. Brumbaugh.

Morrow-Packard Orchards,

Underwood, Washington, November 6, 1910.

Editor Better Fruit:

In renewing my subscription to "Better Fruit" I wish to add my mite of praise and expression of appreciation of the value to any fruit growing community of your instructive and artistic publication. To hundreds of applicants for information on fruit growing, etc., who ask questions (as you know) which to fully answer would require the constant study and practical experience of a lifetime, I try to tell them all I can, and then recommend "Better Fruit," and this for no other reason than that I think it is good advice.

Sincerely yours,
P. I. Packard.



View of the Vrooman Farm, Santa Rosa, California, from which we get all the scions and nuts from which are produced

ARE YOU LOOKING AHEAD

To the time when there will be the same interest devoted to producing HIGH PRICED WALNUTS as there is now to HIGH PRICED APPLES? The time is surely coming. Now is the time for *you* to commence planting Walnut trees. Think it over. We would have you investigate the Walnut that has no Peer, the

Vrooman Pure Strain Franquette

The nut that combines hardiness, size, prolificness, richness of meat, immunity from blight, in fact, it has more virtues and fewer faults than any other Walnut on the market today. California growers are planting the Vrooman Franquette in preference to all others. They know its merits. Space here is too expensive to explain the Vrooman Franquette fully.

Drop us a line and get full particulars

Oregon Nursery Company

Salesmen Wanted

Orengo, Oregon

The FAMOUS REX SPRAYS

REX LIME AND SULPHUR SOLUTION, the original concentrated preparation for spraying fruit trees and for animal dip.

This article has been on the market for some eight years and wherever used throughout the United States has given universal satisfaction. It has always been recognized as the highest standard of commercial solution. Because some of our imitators have succeeded in making a concoction that gives a fair Beaume test is by no means a sign that they have the merit that Rex has. We quote the following from the Michigan Experiment Station, Chemical Division:

Mr. W. S. Pullen, Hillsdale, Michigan.

Dear Sir: I send you herewith the results of our analyses of the three samples of spray mixture which were brought to this laboratory by Professor Eustace of the horticultural department:

	No. 1 Lab. No. 2488	No. 2 Lab. No. 2489	No. 3 Rex Lab. No. 2490
	Per cent	Per cent	Per cent
Total sulphur	14.61	17.40	26.23
Total lime (CaO)	6.32	7.93	10.38
Sediment	16.59	12.90	.....
Beaume	34.4	34.2	33.

As the insecticidal value of the lime and sulphur solution is without question due to the amount of sulphur combined which goes into solution, you will readily see that the REX solution is equal in value to one and one-half times as much as Solution No. 2, and one and eight-tenths more than Solution No. 1. The large amount of sediment in Solutions 1 and 2 would of course lower their efficiency. I will send you a report of the arsenate of lead in a few days. Yours very truly, A. J. PATTEN, Chemist.

P. S. (By W. S. Pullen): Samples 1 and 2 were home-made, and we had a good plant.

Yours very truly,

W. S. PULLEN.

This proves that the analyses of this state official bulletin shows that Rex will stand from 10 to 60 per cent greater dilution than any of these brands, and shows that the directions for Rex are right and that every one of the others is wrong. This also shows that Rex at the same price per barrel is from 10 to 60 per cent cheaper than the others.

REX ARSENATE OF LEAD

We are also prepared to furnish our customers with the highest grade of Pyro and Ortho Arsenate of Lead, having the following guaranteed analysis:

Over 15 per cent arsenic oxide; not more than 50 per cent moisture, and less than one-half of 1 per cent soluble arsenic. The facts are, that Rex Arsenate of Lead averages over 16½ per cent arsenic oxide and less than one-quarter of 1 per cent soluble arsenic. So you see that this is far better than what is required in the federal insecticide law.

FOR INFORMATION AND PARTICULARS ADDRESS:

California Rex Spray Company
Benicia, California

Yakima Rex Spray Company
North Yakima, Washington

Wenatchee Rex Spray Company
Wenatchee, Washington

THE PANAMA EXPOSITION.—The extraordinary energy and resourcefulness exhibited by San Francisco in its great fight for congressional recognition of its claims to be officially designated as the site for the Panama-Pacific Exposition is regarded by the Cleveland Plain Dealer with amazement and admiration. The fact that San Francisco has planned to raise \$17,500,000

for the exposition makes the editor gasp in astonishment, and while he commends the spirit he doubts the wisdom of the risk. That doubt, however, has been shared by others, and quickly disappears when the immeasurable resources of California and the comprehensiveness of the plans for the exposition are thoroughly understood. Commenting on the fight for the exposition, the Plain Dealer says:

"When a man mortgages his home or his business to buy an automobile for pleasure, thinking people comment on his lack of judgment. What, then, should be said of a state which mortgages the future to build an exposition? That is virtually what California has decided to do. The assembly has authorized two amendments to the state constitution, one permitting the raising of \$5,000,000 by special taxation to cover a term of years and the other permitting San Francisco to raise the same amount by a special bond issue. The citizens of San Francisco have already subscribed \$7,500,000 to secure the exposition. So the city's bid for the coveted event in 1915 reaches the commanding total of \$17,500,000. New Orleans, the other aspirant for the Panama Exposition, may here read what she must do to win the favor of Congress. For the national legislature at the last session postponed its decision on the location of the canal celebration until it could learn which of the two leading cities would offer the more substantial inducement. It would seem doubtful whether the Louisiana city can do as well as the opulent Pacific Coast has done."

LILLY'S BEST SPRAY BOOK

This is the book every fruit grower and farmer needs. It is complete in every detail including an absolutely scientific Spray Calendar with diseases and insects illustrated and described.

HAND AND POWER Spray Machinery



Tested sprays and insecticides are all included together with prices, illustrations and full descriptions. Lilly's Spray Book is a practical guide. Send for it—free to those asking. Chas. H. Lilly Co., Seattle.

IF YOU WANT TO KNOW MORE ABOUT THE WEST,

Resources, opportunities, life, literature, etc., don't delay, but send the coupon at once. The West of today will astonish you. There is something doing in the empire beyond the Rocky Mountains that will interest you. Get in touch with a live land, where fortunes await the willing.

The Pacific Monthly Company,
Portland, Oregon.

Enclosed find 25 cents. Please send three recent numbers containing information about the West.

Name.....

BF Address.....



Read what Hood River says

Hood River, Oregon, November 27, 1909.
This is to certify that I have used Cooper's Tree Spray Fluids, V1, for killing San Jose scale and found it very effectual.

G. R. Castner, County Fruit Inspector.

APTERITE THE SOIL FUMIGANT DESTROYS INSECTS IN THE GROUND

REDUCES LOSSES SAVES PROFITS
IT WILL PAY YOU TO INVESTIGATE
Write for 1910 booklet (32 pages)
Testimony from fruit growers
everywhere

Agent:

C. G. ROBERTS

247 Ash Street Portland, Oregon

Sole Manufacturers:

William Cooper & Nephews
CHICAGO, ILLINOIS

QUALITY WINE GRAPES

BY AUGUST WOLF, SPOKANE, WASHINGTON

"QUALITY wine grapes that will successfully rival with the best products from the Rhine, Moselle and Pfalz district in Germany, and with the Bordeaux, Gironde and Medoc in France, can be grown in many parts of Eastern Washington, Northern Idaho and North-eastern Oregon, where the dreaded pest, the phylloxera, cannot exist because of the sandy loam, clay, alluvial, volcanic ash, slopes, elevation, sunshine and temperature and rain conditions, principally between the months of May and October."

Albert Angermayer, for five years superintendent and cellar master in California wineries and vineyards, before which he was engaged in the wine industry in the famed grape districts in Germany, says this in a letter from Portland to the Spokane chamber of commerce. He has intimate knowledge of the Inland Empire, having traveled six months in 1907 as an expert to spy out lands suitable for the raising of quality wines in the interest of an Alaskan millionaire. "My trips were successful and more than satisfactory," Mr. Angermayer adds, "but the financial crisis at the close of 1907 brought the large enterprise to a quick end, and the buying of lands and the establishment of vineyards had to be abandoned. I am thoroughly convinced that quality wine grape, also the suitable table grape cultivation in Washington, Idaho and Oregon would in a comparatively short time be so enormously successful and profitable that it would be in the lead of all other fruit varieties, and by expert treatment in the vineyard and time of harvesting, in winery and cellar it would achieve a world-wide fame."

To show that the grapes grown in the Inland Empire are far ahead of the California product for wine making, Mr. Angermayer says that every pure white or red wine made in that state leaves a vinegar taste, adding:

"The European connoisseur, and every one with the senses of taste and smell, know that a healthy wine dare not taste or smell after vinegar. Many of the wine merchants and wine producers, especially the large houses, know exactly what is the cause, but in their own interest they cannot betray it to the public. Most wholesale wine houses employ experienced cellar masters, usually with a knowledge of chemistry, who try to reduce this vinegar smell and taste in the pure wine, because until now there is no remedy known for the entire banishing without greatly damaging the wine. The shrewd wholesale wine merchant and the experienced wine grower in California know well that

WHY PAY FREIGHT ON WATER?
BUY

Vreeland's Electro Arsenate of Lead

IN POWDERED FORM

The most effective and economical insecticide for all leaf-eating insects. Electro is the only successful powdered Arsenate of Lead because it is the only one that mixes instantly with water in such a finely divided state that every drop of spray contains the right amount of arsenic. It cannot be washed off by rain, and will not injure the newest, tenderest foliage.

We guarantee it to contain 30 per cent arsenic oxide—50 per cent more than other brands—as proved by Connecticut and New Jersey Agricultural Experiment Station tests. Write us for them. Save the freight on water—there is 40 to 60 per cent in all pastes. Put in the water at home.

We also have the best paste on the market, and will prove it if you prefer Arsenate of Lead in this form.

Write us if your dealer cannot supply you with Electro brands. Do not accept substitutes.

CHAS. H. LILLY & CO., General Distributors, Seattle and Portland
(Agents in all principal districts)

Manufactured by VREELAND CHEMICAL CO., 50 A Church Street, New York City

they can never produce a real, qualitative, pure wine, for which they would receive the highest prices, similar to those paid for the European product. For this reason they aim at getting large quantities. Thus it is easier for him to reduce the strong vinegar smell and taste in the California dry wines by blending with other fermented artificial wines made from husks of grapes, raisins and sugar, and much water, that can be manufactured cheaply at all seasons, ready for the market in from two to three weeks, without tasting or smelling after vinegar. Every grape, apple, berry or other wine smelling or tasting after vinegar will, in time, according to the cooler or warmer storing and air admission caused through the immense and quick increase of the vinegar fungus, become pure vinegar. In most of the Californian wine cellars are none, or only very little, quantities of white or red wines to be found older than a few months or years. I know firms in whose cellars are continually immense quantities of wines, composed of water, sugar,

raisins, tartar acid, glycerine, a small fraction of pure wine, manufactured in three weeks, ripe for bottling, sold and shipped weekly, often in several carloads.

"It is comprehensible that California very much prefers being a wine land than vinegar land, but it is hard to fight against facts and against nature. You will be astonished to hear that this vinegar smell and taste in most of the California wines originates from the otherwise so appraised and favorable climate. At the maturing and harvesting time of the wine grape it is still very warm in most all California wine grape cultivation districts, so that the mashed grapes, or grape cider, immediately starts to ferment in the open air, rapidly causing vinegar fungus before they are put into tanks, into which large quantities of mashed grapes cannot be sufficiently shut off from atmospheric air during the eight to fourteen days continuing tempestuous main fermentation. The fermentation of the white grapes cider, and of the mashed red grapes, also even of the storing

Do You Spray? If so it will pay you to become acquainted with our LATEST Spraying Material

"BLACK LEAF 40"

THE "BIG BROTHER" TO OUR CELEBRATED "BLACK LEAF" TOBACCO EXTRACT!

That is "Big Brother" in comparative strength (being nearly 14 times stronger), but "Little Brother" in size—having only about one-twelfth the comparative shipping weight.

This means a big saving in handling—particularly over rough roads—one 10½-pound package producing 1,000 gallons of effective spraying material against green aphids, etc.

Owing to the large dilution, neither foliage nor fruit is stained.

Like our "Black Leaf" Extract, "Black Leaf 40" may be applied when the trees are in full bloom and foliage, without damage to either.

Also "Black Leaf 40" is perfectly soluble in water—no clogging of nozzles.

"Black Leaf 40" is even less volatile than "Black Leaf" Extract, being Nicotine Sulphate; and is guaranteed to contain not less than 40 per cent nicotine by weight.

"Black Leaf 40" has been extensively tested by various experiment stations, and our free leaflet contains a strong array of expert testimony. Write us for a copy. It will certainly interest you. Use the attached coupon.

PRICES:

10½-lb. can, \$12.50, makes 1000 gallons

Containing "3/100 of 1 per cent Nicotine"

2½-lb. can, 3.25, makes 240 gallons

Containing "3/100 of 1 per cent Nicotine"

½-lb. can, .85, makes 47 gallons

Containing "3/100 of 1 per cent Nicotine"

To save you freight: Write us for the name of our Agent nearest you.

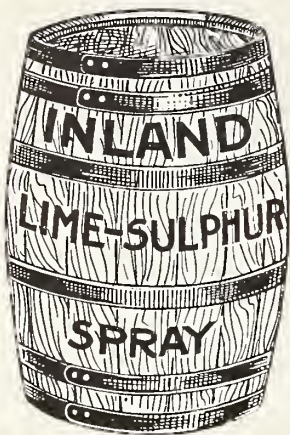
The Kentucky Tobacco Product Co., Inc.
Louisville, Kentucky

KENTUCKY TOBACCO PRODUCT CO.
Louisville, Kentucky.

Please send me your free leaflet containing "A Strong Array of Expert Testimony." Also address of agent nearest my station.

My name is

My address is



"INLAND BRAND" Lime-Sulphur

"BETTS" FLUME CEMENT

Antiseptics Disinfectants, Etc. Chicken Lice Killer

THE C. G. BETTS COMPANY

MANUFACTURERS

Erie and U. P. Tracks

Spokane, Washington

of the older wines, is done mostly on the ground floor in cheaply constructed sheds, instead of in underground cellars, of even temperature like in Germany.

"During my stay of five years in California as superintendent and cellar master in different vineyards and orchards, I had the best opportunity to become thoroughly acquainted with the native table and wine grapes' cultivation, wineries and cellars, also to make comparisons with the world-famous wine cultivation, and the wineries and cellars, guarded by the most severe laws, on the Moselle, the Main, in the Pfalz and Rhine, where I was born, lived 40 years and gained my experience in this branch as vineyardist and orchardist, wine and champagne producer. Good vintages, for example, 1895 Rhine wine, Riesling Auslese, two years old, we have by public auctions received as high as 43,000 marks for 1,200 liter, that is about

\$10,000 for 300 gallons. This excellent quality wine went to New York, where there is always a good market for choice and highest priced wines. I soon found that the unfavorable, too warm climate in California during the wine grape harvesting is the main fault of the vinegar tasting and smelling wines, and the thought occurred to me that in the more northern state with about the same latitudes and elevations above sea level as the wine grape growing districts in Germany and France, the climate must be better adapted for raising quality wines. I have studied thoroughly the United States weather reports of the states of Oregon, Washington and Idaho during the last three years and found that various counties, or districts, of these states, in consideration of the elevation, large water courses, quality of soil, slope, rainfall, temperature and sunny days, must be better adapted to raising quality wines

than California, with its too warm fall climate and its dry wines, containing also a too high percentage of alcohol.

"Considering the different soils, sandy loam, clay, alluvial, volcanic ash, top and sub-soils, irrigated and non-irrigated lands, slopes, elevation, sunshine, temperature and rain conditions, principally between the months of May and October, I would say that if the best adapted wine grape varieties for setting out are chosen, then in many parts of Oregon, Washington and Idaho, by right treatment and care, there can be grown quality wines that will successfully rival with the best quality wines from Rhine, Moselle, Pfalz, etc., in Germany, and with the Bordeaux, Gironde, Medoc, and, eventually, champagne in France. The districts named may, perhaps, even excel them. In making this statement it must be considered that a danger, like in other countries and states, arising through the phylloxera, dreaded pest, is absolutely excluded in the sandy volcanic ash soil in Eastern Oregon, Washington and part of Idaho, because the phylloxera cannot exist in sandy soil."

Pullman, Washington, October 27, 1910.

Editor Better Fruit:

The Orchard Heating number is one of the most valuable numbers issued and should be in every orchardist's hands in the West, and a few of our Eastern friends would find good pasture for their consideration.

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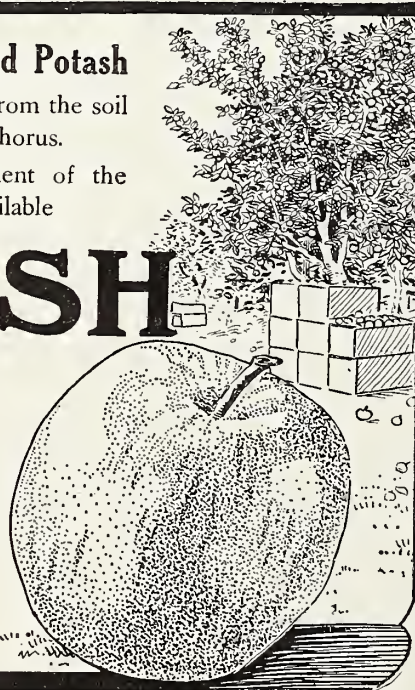
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MR. T. W. STIRLING, ON PRUNING APPLE TREES

READ BY MR. TAYLOR, AT NORTHWEST FRUIT GROWERS' ASSOCIATION, VANCOUVER, B. C.

ANY fruit grower on being pointed out an apple tree, can say at once whether it is well shaped or badly shaped. The general characteristics of such trees as would be called well shaped by an experienced fruit grower are found to be somewhat as follows:

The main branches spring from the trunk at a good broad angle. They do not spring opposite to each other, but are distributed up and down the trunk. They are evenly placed around the tree and do not interfere with each other. There is a definite center stem from which they spring, and which extends above the main side branches. Such a tree is of the strongest possible frame. It will carry its proper load of fruit without propping. There is no fear of it being split down to the ground and ruined by an over weight of fruit, or by wet snow or any other cause. The greatest damage that will be likely to happen to it will be the breaking of a bough, an injury which can easily be repaired and the loss replaced within a short time. If any main branch is overlaid and breaks off, the injury to the trunk will be comparatively light; there will be splitting. Always fresh shoots can be grown from the center to replace broken branches. After all the main stem

of the tree is the tree; keep that intact and the tree is still there to grow any branches which may be required. To illustrate the advantages of this form it is only necessary to think of another form which is very common. That is the tree where the center has been cut out and never replaced, where the branches all spring from about the same point, as the fingers grow from the palm of the hand. Such a tree, when the day of trial comes, either from an overload of fruit or from a fall of wet snow, yes, and sometimes by reason of its own weight, will get tired and lie down, splitting right to the ground so that there is nothing left from which a new tree can be grown.

Now, shaping a tree is not the whole art of pruning, and by shaping a tree is meant that treatment of the tree in its earlier years which definitely determines its general form; a tree may be well shaped in this sense, yet at the same time woefully in need of cutting and clearing out, but this latter branch of the pruner's art cannot be dealt with adequately in a paper, and it is the first only which is the subject of this present effort. The object of this paper, then, is to outline a method and to state a few short rules, which, if followed, will insure every tree growing up in a correct form. The rules are three in number, viz.: (1) Keep the leader. (2) Have but one leader. (3) Make the leader lead.

The explanation of these and method of carrying them out in practice is as follows: The tree is planted as a yearling whip and cut back to about three feet, or a little less, from the ground with the object of forcing buds into decided growth, so that there may be something to work on the next spring. The first real step towards shaping the tree is taken the spring after planting, preferably when the buds are just beginning to show green. It will be found then, if the tree

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has established itself, that some of the buds near the top, very generally three, have made a strong upstanding growth, coming out from the stem at a very acute angle; lower down more shoots will have grown from the stem at a greater angle than the leaders, and usually have not made such a strong growth. It is from these latter that the first tier of branches may be chosen. Of the one, two or three strong upright shoots near the top, select the best and most upright as the leader, and sacrifice the remainder. If they are retained with the idea that they will become satisfactory side branches, amenable to discipline, it will be found to be a mistake. They will not do so, but will for years be a source of bother, competing continually with the leader for supremacy. Cut them out, leaving but the one leader. From the shoots lower down select, if possible, three side branches. These must be evenly distributed around the tree in a horizontal direction. In a perpendicular direction they must be well separated, the angle they make with the trunk should be large, nearly a right angle. If there are not three shoots that satisfy these conditions then leave only two or one that does; better one right than three wrong; plenty more shoots will grow during the current year to fill any vacancies. (N. B.—Certain varieties of trees, for instance the Northern Spy, have shoots which almost invariably spring from the stem at an acute angle. In such cases it cannot be expected that shoots will be found to satisfy the third condition mentioned above. It is as well, then, to use a spreader to cause the shoots to grow in the desired direction.)

Having selected the shoots which are to remain, and removed the others, cutting them off close up to the stem, it is necessary to cut them back. It will be observed that the buds on the upper end of the wood shoot are better developed than those near to the base. The object in view is to give the leader the start and to have it keep ahead of the rest, therefore do not cut it back too much. Cut it amongst those buds towards the upper end, perhaps one-third of its length down from the tip. In regard to the side branches. Perhaps amongst those retained one or two are weak, and one or two are strong; these latter, perhaps, nearly as strong as the leader. It is they which require to be watched or they will start racing for supremacy with the leader. Put them in their right place right away. Cut them back to within three buds or so of the stem. The buds here will be very much backward, and by the time they have been forced into growth the leader will have shoots several inches in length and there is no fear that the side branches will catch up.

The following spring the process will be much the same. The leader will be treated practically

as was the whole tree the year before. The lower tier of branches of last year will probably have made two or more shoots. Almost invariably one will be enough to leave, and that should be cut back among the well developed buds towards the extremity, or about one-third in from the tip. The next year will be time enough for these side branches to have side shoots. The next year will be a repetition of the first and second, except that there will be an additional tier of branches to prune. The treatment of this lower tier, this year,

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will be somewhat similar in principle to that of the leader the first year. The cutting of the preceding year will probably have resulted in two or three strong shoots growing from the end and one or two weaker shoots growing further in on it. Of the strong shoots at the end but one should be left, and that cut back as before about one-third; of the others one or two may be left, as there is room or not. After this, if all has gone right, as it will have done with a normal-growing tree handled as suggested, the tree may be considered to be formed, and it is usually unnecessary to continue cutting back the leading shoots. The leader will be firmly established and the tree will tend to keep the form in which it has been trained. Subsequent shaping will simply consist of thinning out superfluous shoots and branches, keeping a just balance between all side boughs. The idea to keep in view is to give the leader the preference when cutting out; that is, if a shoot from the center is crowding a shoot from a side bough it is the latter that must give way.

Should the shaping have been neglected in the earlier years, or should an injury have happened to the leading shoot, it is often found that one of the side branches has come ahead of the leader and is competing with the leader for supremacy. There are three things that may be done, and one of them must be done, if a well shaped tree is to result. (1) The side branches may be cut off. (2) The tree may be cut off immediately above the side branch, and thus the latter becomes the leader. (Where the side branch has grown practically as large as the rest of the tree above it, one of these two things must be done.) (3) Check the side branch back hard by cutting it off immediately above one of its own side shoots. The stronger it is the lower down must it be cut. This latter will be best where such cutting it likely to be efficacious in putting the side branch in its place; it will, however, in any case, have to be watched the next season. Always the side branches must be headed in in this way if they show signs of coming ahead of the leader until they are finally induced to take a subordinate position. It will likely now be found that there are too many branches, and that they are crowding each other; no matter, it gives a choice, and if any have to be sacrificed their existence will not have been wasted, they will have assisted to thicken and strengthen the main stem.

It is not claimed that there is anything new in this paper, it is simply an attempt to state in clear and concise language a definite system which at any rate has the merit of producing surely, and without waste of time, energy in plant growth, the result aimed at. The attempt seems to be justified because this part of the orchardist's art has not often been stated either clearly, concisely

or completely, and it is very necessary to have clear and definite ideas on the subject. With a clear mental picture of what is needed in regard to shaping a tree the pruning of young trees is a rapid and sure operation. The tree is pruned and shaped mentally as the operator walks towards it. A few deft cuts with a sharp pair of shears and it is done.

Lacking this clear idea there is indecision and doubt, the indecision of the first year produces the puzzle of the second year, which in the third year becomes an insoluble problem, or rather one only to be solved by sacrificing half or more of the tree and thereby wasting the greater part of the energy of growth that the tree has put forth in the past.

Mr. Mason: I want to say that when Brother Maxwell Smith asked me to give him a talk, I asked for the subject of the apple tree, and I came here before you to give you some ideas that I think are beneficial to you. I build my tree like a vase. Mr. Stirling says that it will break with sleet and snow. I start my tree just as my neighbor does; then I cut it back, and cut back that center stock, to get a good growth; and he was also right in letting the leaders up in advance, but keep the tree hollowed out. When that tree is four or five years old and begins to lop over, take and tie the tree with strings. When these uprights get as large as your thumb, get a large thumb-screw and a ring and some wire, and in place of having one center upright, you have from five to eight, which are just as strong as a center tree, and you have increased the circumference from six to eight feet. If you have a vase-shaped

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tree, you have a hardier tree from six to eight feet around, or four to six feet across. I have not had a prop in my orchard for three years, and expect never to again. There are men in this audience who visited my orchard this year, and they know that what I say is true. This is why I wanted to get before you where you can see me. I don't want you to build a center top tree, because the open tree is so much better. Then for picking, the tripod stepladder is so much better, and three men or women can work from it at one time; it is so much easier. It is always a fight between the girls and boys to get on to those tripods. Now, another advantage in an open center tree; we all grow trees for color. One of the strong arguments of a paper given at Seattle was the circulation of air; and when you have an open center tree you also get sunshine in addition to your circulation of air. Now, if any of you come to Hood River, come and see me and see if what I tell you on pruning is hot air.

Mr. Honsberger: We have heard something of color in fruit, but look at ours, and those apples were not grown on trees shaped like a vase. Certainly the vase-shaped tree does not do in our upper country. I don't know whether you have the weight of fruit that we have or not.

Mr. Mason: I didn't explain how I support my

tree. All the side limbs of the trees are tied to those five or eight uprights, and you can pull down on the tree and it is just like an umbrella.

Mr. Palmer: I may say that my ideas have been changed about pruning. Once I believed in the pyramidal form, but since seeing Mr. Mason's, I believe his best. The branches don't all commence from the same place. I think that device is all right.

Mr. Johnston: I bought a whole orchard, and all my trees were vase-shaped, and nearly all my trees have broken down. I intend to go to Hood River and see the vase-shaped form.

Mr. Maxwell Smith: I wish to take the blame of that paper being given to this audience, and I want to take the part and come to the defense of the absent author. The advocates of the vase-shape and the pyramidal form of tree may talk all night and not be able to agree, but that is no reason why either one is all wrong. Now, there are merits in both forms of trees, and good arguments, under certain circumstances and conditions, in favor of either form. But I want to tell you that Mr. T. W. Stirling, the author of that paper, has made lots of mistakes in pruning trees. He has found out a great deal by actual experience, and perhaps he is the foremost individual fruit grower in British Columbia up to the present time.

He it is who has done more to develop the fruit industry and bring the Okanogan Valley before the eyes of the world, than any other man, and I want to tell you that what he says is reliable information; and I regret very much to receive his paper without himself, as his medical adviser said he was not in a fit condition physically to travel. His paper, however, is an important one.

Mr. Anderson: I must add a word to Mr. Johnston's. Our experience in British Columbia is overwhelmingly in favor of the pyramidal form. An orchard of vase-shaped trees some years ago was totally destroyed. An early storm came on and there was not a tree left in that orchard when the storm was over; and I believe that whatever is done in Hood River, that here in British Columbia our experience is overwhelmingly in favor of the pyramidal form of tree.

Mr. Mason: Brother Anderson, did he fasten his limbs after he got up eight or ten feet?

Mr. Anderson: No, but in the pyramidal form of tree we have discovered that very little support is necessary.

Mr. Taylor: Mr. Stirling's idea is that a tree should not have to be propped at all, or artificially supported in any way.

Q. He prunes the fruit?

Mr. Taylor: He thins all the fruit.

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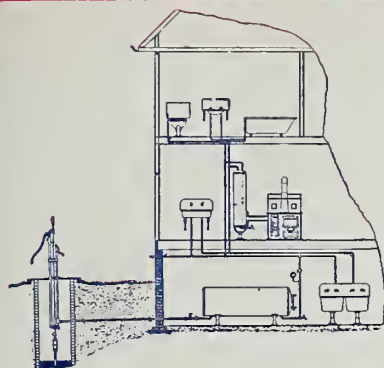
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Leader Water System

IN YOUR HOME

No doubt you have often envied your city friends and wished for the conveniences afforded by modern water supply under pressure, in your home. The **Leader Water System** will enable you to enjoy these advantages more thoroughly than is possible with any other system. The **Leader** is not an ordinary farm water supply system, with its attending troubles and annoyances; it is far from ordinary. It will furnish a dependable supply of water wherever and whenever you desire it. You can enjoy modern home conveniences, such as the bath, toilet, etc. You will have plenty of water for all domestic purposes, the laundry, sprinkling and **PROTECTION AGAINST FIRE**, that danger which constantly menaces the rural home. Pressure up to 125 pounds may be maintained with **The Leader System**. As is shown in the illustration, the tank may be placed in the basement (more often it is placed underground), where it keeps the water cool and fresh in summer and prevents freezing in winter. The beauty of **The Leader System** is that it is practically troubleless. With the exception of a few moments when water or pressure become low, it needs no attention. But for the fact that every time you have occasion to call on its services you are reminded of its efficiency, you would forget that you had such a thing as an independent water supply. We will be glad to give you an estimate on a system that will meet your requirements. Use the coupon.

USE THE SLIP AND GET OUR FREE BOOK, "QUESTION OF WATER"

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Vehicles and Implements

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Send me your book, "Question of Water."

Name

Address

INSURE YOUR CROP BY USING THE TROUTMAN ORCHARD HEATERS

Insure Prompt Delivery by Ordering Today

In purchasing orchard heaters remember that we have all sizes of heaters, from the smallest to the largest. If you want a reservoir heater we have the most efficient on the market. We don't advertise our reservoir heaters as extensively as we do our Intermediate and Standard heaters, for we believe in "little fires," and the temptation is in using large heaters, to use fewer to the acre, with greater area. This is the wrong principle, as large fires will not do the work that small fires will well distributed.

If you use a reservoir heater use it as such, and not as a furnace. Remember, the very minute you open a reservoir heater wider than the standard opening it loses its reservoir feature, and will have to be refilled as often as the smallest heater.

We would caution the growers against buying heaters that rest directly on the ground, as they will soon rust out and be worthless. The base of the Troutman Heaters protects them from this danger.

If you want your heaters to last indefinitely buy our **Galvanized Heaters**, the only non-rustible and non-leakable heaters on the market. These cost a little more than the plain black iron, but they will last twice as long.

If you are going to protect small fruits, like strawberries, use the "Troutman Attachment," the only device made for this purpose. The heat is thrown downward instead of its escaping into the heavens before fulfilling its mission. The regulation of heat, by raising or lowering the cover, is perfect.

If you want something cheap, regardless of the quantity of oil consumed, use our Lard Pail heaters. Professor O'Gara, in his article in the October issue of Better Fruit, says this heater is as efficient as the Fresno, or other heaters with a row of holes around the top. This is what we have always claimed—that the lard pails would give the same result as all other heaters that are without the center draft combustion.

Remember this, however; when you use a heater without the center draft you will consume fifty per cent more fuel for heat produced than you will when using the Troutman Heaters. This makes all other heaters costly at any price, and not to be considered. We realize there is a difference of opinion as to what size heater to use, and we therefore manufacture seven different types and sizes, so that no one need ever equip their orchard with the "Center Draft Principle" heaters.

The Troutman Heaters are used around the world, and by the most prominent growers. They have had the widest and largest sale of any orchard device. Send for our **Troutman Heaters**. Then send us your orders now. Don't wait until the last minute, for we cannot guarantee prompt deliveries on orders that come in late in the winter. A crop of Northwest fruit is too valuable to lose. You cannot afford to take chances with "Jack Frost" when the chance is so cheap.

IN ORDERING HEATERS ADDRESS

THE ROUND CREST ORCHARD HEATERS
CANON CITY, COLORADO



THE GREAT OBJECTION

Of the average man who wants to own an Orchard Home is the fear of *isolation* and consequent lack of schools, churches and other advantages to which he and his family have been accustomed

**We Have
the Best:**

Soil, Climate
Water
Scenery
Transportation
Natural
Resources



**We do not
have:**

Killing Frosts
Heavy Snows
Sand Storms
Excessive
Heat
Severe Cold
Malaria

We Have Overcome All the Above Objections

our subdivision of the magnificent *Ashland Orchard Tracts* immediately adjoining the *Beautiful and Prosperous City of Ashland* in the *Rogue River Valley*. A perfect tract of two thousand acres in and vicinity of homes and schools in a valley of sunshine and fortune

Plats and Descriptive Matter Upon Request

Suburban Orchards Syndicate

Ashland, Oregon